ALSO IN OUR NEWS SECTION
- UCITA proponents unfazed as ABA refuses to endorse licensing law. PAGE 6
- An early adopter shows that Web services really can work. PAGE 10

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FEBRUARY 17, 2003 • VOL. 37 • NO. 7 • $5/COPY

KNOWLEDGE CENTER ROI

MARIA RENDON

Do the Math!

SPECIAL REPORT

Yes, it's possible to waste time on ROI. But calculating the return on investment for big IT projects can yield big dividends if done properly. We provide a CIO's guide to the strengths and weaknesses of 10 different ROI models.

STORIES BEGIN ON PAGE 21.

ONLINE EXCLUSIVE

Book excerpt: Measure the kind of ROI that the board of directors can understand:

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Microsoft Revamps Datacenter

Adds more support options to program, but impact unclear

BY CAROL SLIWA

Microsoft Corp.'s recently revamped and renamed Datacenter High Availability Program will bring users additional options for support and a quicker path to swap out minor components from their pretested configurations.

But while the changes represent a positive step, it's unclear how much they will affect the existing user base or whether they will spark an uptick in the sluggish adoption of Microsoft's challenger to high-end Unix systems. The new program aspires to the same lofty goals that its predecessor — the more plainly named Windows Datacenter Program — did when it was launched in September 2000.

"The Datacenter product is great. I love that I can vertically scale Intel chips," said Morris Koeneke, database services manager at early adopter Mary Kay Inc. in Dallas. "But the Datacenter program is in desperate need of repair, and I'm not optimistic that they've really fixed the problem."

Koeneke said he would like more choice with the systems that attach to his Datacenter server, since he would like to do more mixing and matching of products. But he doesn't want to have to pay the OEM to test the configuration.

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VIRTUAL DATA CENTER

A Microsoft executive discusses the company's virtualization plans:

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www.computerworld.com

Hardware vendors supporting Microsoft's Datacenter High Availability Program include:

- **Unisys**
  PRODUCT: ES7000
- **HP/Compaq**
  PRODUCT: ProLiant
- **IBM**
  PRODUCT: X440

SOURCE: MICROSOFT CORP.

Stage Set for Easy, Cheap Rollouts of IP-based Storage

Approval of iSCSI standard paves way for product deliveries; users welcome alternative

BY LUCAS MEARIAN

After some fits and starts, an IP version of the low-cost SCSI storage interconnect is finally in position to attract wider attention from technology vendors and users.

STORAGE STRATEGY

The Internet Engineering Task Force's IP storage steering group last week formally ratified the iSCSI protocol as a standard. That paves the way for storage vendors to ramp up shipments of products based on iSCSI, which is designed to let network administrators take servers that have been locked into direct-attached storage systems and plug them into IP-based networks for data backup and management functions.

After the vote, the IETF released the iSCSI specification for public comments. David Black, a senior technologist at EMC Corp. and co-chairman of the IETF's IP storage group, said the comment period should last about a month.

But, he added, "at this point, nothing will change. We're done in terms of technical changes."

Because IP networks are commonplace, iSCSI can be used to transmit data over LANs, WANs and the Internet, potentially allowing users to access information via corporate intranets or Web-based portals. "Whatever you can do with an e-mail, you can do

iSCSI, page 49

Sun to Ship Technology Modules

Strategy aims to ease complexity, promote integration, cut costs

BY JAIKUMAR VIJAYAN

The flurry of products and services announced by Sun Microsystems Inc. last week is part of the company's strategy to offer technology bundles that are more integrated, more integratable and that the company will custom-configure for users as needed.

As part of that strategy, Sun is moving to a quarterly cycle of technology releases that combine hardware, software, middleware and services products, company officials said last week.

Sun will no longer roll out individual hardware or software products but will instead focus on delivering pretested and easily configurable technology modules that users can quickly plug into existing infrastructures.

New Under Sun

- Blade servers based on SPARC and Intel processors
- A 12-processor midrange server
- Blade server virtualization software
- High-end CPU upgrades
- N1 assessment services

The data center optimization technologies that Sun is rolling out as part of its N1 initiative will play a key role in

Sun, page 14

NEWSPAPER

Can't access
Wants to write e-mails offline
Wants to view Web sites offline
Repetitive configuration problem

Managing mobility can be challenging.
That's why there's Windows XP and Office XP.

Recognize any of those issues? Or, perhaps, all of them? We thought so. Many of these issues can be related to your legacy desktop software. Fortunately, many of them can be addressed by features in Microsoft® Windows® XP Professional and Office XP Professional.

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Sky-high dial-up charges
Wants to sync laptop and
Wants to work offline
Can't get connected
Needs to share

Want specific examples? Windows XP Professional offers new Remote Assistance, which enables you to view a user's screen and control the user's computer to solve technical problems from afar. Office XP Professional gives you installation support for HTTP, HTTPS, and FTP, which means you can install and maintain the suite directly from a Web server or a file share on your network. And finally, several new features make deployment easier than ever. For more ideas about managing your desktops, visit **microsoft.com/desktop**

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KNOWLEDGE CENTER ROI

Do the Math!

This special report takes an in-depth look at the financial models for assessing the return on investment from IT projects. CIOs talk about the payoff from "doing the math," and we provide a guide to the strengths and weaknesses of the major metrics, such as net present value and internal rate of return. But we also hear from the dissidents, who say ROI calculations can be a waste of time.

SPECIAL REPORT

PACKAGE BEGINS ON PAGE 21.

STEVE BROWN

24 Diligence Rewarded. Tips from the pros: Learn how four IT executives measure ROI from technology projects and what they gain from their efforts. **ONLINE:** For more on Carlson Companies' approach to ROI, including how a possible war with Iraq might factor into its analysis, read the full Q&A with CIO Steve Brown. **QuickLink 35952**

40 Opinion: If you're chasing after every IT project with ROI analyses, you're wasting your time, suggests columnist Mark Hall.

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43 The Next Chapter: Pundits predict that Wall Street analysts will start monitoring corporate IT investments and that CIOs will find their compensation linked to delivering ROI. But are we developing "ROI myopia"?

ROI GUIDE

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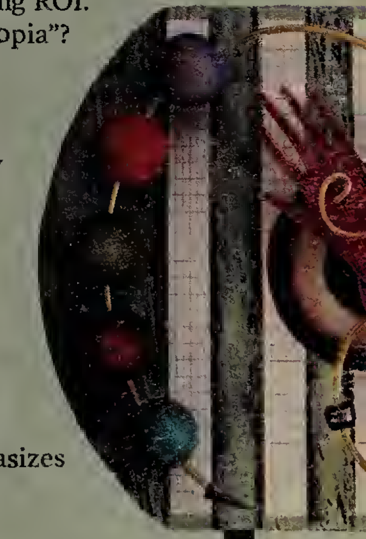
30 Net present value is an investment's future net cash flows minus the initial investment.

32 Internal rate of return is a handy way to sort projects into "go" and "no-go" categories. But it has flaws.

34 Balanced scorecard is intended to consider everything that's important to a company's long-term health. But there's a danger of losing the forest in the trees.

35 Economic Value Added is a business philosophy and ROI metric that makes sure managers subtract the cost of capital from the financial benefits of an investment.



36 The Consultants' Offerings. Consultancies are inventing new ROI metrics at a steady pace. Here's a look at five: Business Value Index, information economics, IT scorecard, total economic impact and total value of opportunity. **ONLINE:** The Real Options model, championed by Collaborative Consulting, emphasizes an incremental approach to IT investment. **QuickLink 35929**

38 Where ROI Models Fail. ROI models are effective in helping CIOs justify IT investments to top executives, but they fall short in measuring soft benefits like the impact on sales, customer service or employee productivity.

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The New ROI

There are no more stand-alone IT projects, just business projects that involve people, processes and technology. And the ROI should be evaluated for all three, according to an excerpt from a forthcoming book by The Hackett Group's David Axson. **QuickLink 36409**

Maximize ROI With a Project Office

IT projects will be more successful — and have a greater ROI — if there's a program management office keeping an eye on them, says one IT consultant. The savings produced will far exceed the cost of staffing. **QuickLink 36122**

Stop the ROI Chaos!

Q&A: Companies need a standard ROI process and lexicon, say the co-founders of management consultancy Mainstay Partners. Why? A hodgepodge of ROI metrics will make it hard to evaluate investments on an apples-to-apples basis. **QuickLink 36111**

AT DEADLINE

Ridge Releases Cyberdefense, Physical Strategies

Secretary of Homeland Security Tom Ridge on Friday released the final versions of the Bush administration's national strategies to defend critical infrastructures from cyber and physical attack.

As the nation remained at Code Orange – the second-highest level of alert – Ridge said the two strategy documents are critical to the future planning of the new U.S. Department of Homeland Security. The "National Strategy to Secure Cyberspace" and the "National Strategy for the Physical Protection of Critical Infrastructures and Key Assets" will help guide governments and businesses in their efforts to defend the country from terrorism, said Ridge.

One of the first priorities of the administration's cyberdefense strategy will be to establish a national cyberspace security response system that will enable the government to coordinate with the private sector on analysis, warning, incident management and recovery efforts stemming from a coordinated cyberattack against the U.S.

Howard Schmidt, acting chairman of the President's Critical Infrastructure Protection Board, said a major thrust of the cyberdefense strategy is to work with the private sector to reduce the nation's vulnerability to attack. In addition, the Homeland Security Department is considering a cybersecurity alert system that would work in conjunction with the overall Homeland Security Alert System.

Noticeably absent from the final version of the national cyberdefense strategy is any mention of regulating the private sector to force improvements in security. While Schmidt said the goal from the very beginning was to build a "partnership," Bob Stephan, special assistant to Secretary Ridge for information analysis, said regulation could be an option for some industries, such as chemical manufacturing, where the threat to public health and safety is particularly acute.

– Dan Verton

UCITA Backers Lose Political Ammunition

Bar association declines to give official blessing

BY PATRICK THIBODEAU

BACKERS of the controversial UCITA software licensing law intend to push ahead to win adoption by more states, despite a decision by the American Bar Association last week not to back the proposed law.

The ABA's governing body withdrew the Uniform Computer Information Transactions Act from consideration after it became clear that the measure didn't have enough support among members of the influential legal association.

The move, taken by the ABA at its midyear meeting in Seattle, has no direct impact on UCITA and the push for state-by-state adoption. But it gives the law's opponents ammunition to use against it in states where it's introduced.

UCITA's drafter, the National Conference of Commissioners on Uniform State Laws (NCCUSL), will seek adoption in states that have shown an interest in the act: Arizona, Colorado, Delaware, Oklahoma and Wisconsin, as well as the District of Columbia.

Despite the ABA decision, Carlyle "Connie" Ring Jr., chairman of the NCCUSL's UCITA drafting committee, said he was pleased with the outcome. He claimed that opponents "engaged in counterproductive activity that resulted in the ABA really wanting to leave [UCITA] to the states" to adopt uniform rules.

Ring said there was "a great deal of manipulation of the [procedural] rules" by opponents in order to achieve a negative outcome. But most ABA delegates wanted to take no position because there wasn't enough time to debate the act, nor was the meeting the appropriate forum for deciding its merits, he said.

Not Seeing Eye to Eye

But some ABA members saw the situation differently.

"The thing was dead on arrival, and [supporters] are trying to make [believe] that the ABA didn't want to vote on it," said Hervey Levin, a delegate from the ABA's Tort Trial and Insurance Section and a Dallas-based attorney.

Vincent Polley, chairman of the Cyberspace Law Committee of the ABA's Business Law Section, said UCITA raised concerns among members in part because it's ahead of its time and seeks to put into law provisions that aren't in common commercial practice. He also said that UCITA is confusing and complex and that its controversiality means it's likely to be altered in the various states and therefore not such a uniform law. Polley is deputy general counsel at Schlumberger Ltd., an oil-field services firm in New York.

UCITA is designed to set uniform terms and conditions for software sales and electronic transactions. The measure is supported by vendors and trade groups, but opponents believe it gives vendors too much power in contracts.

UCITA's proponents say that ABA backing isn't critical. "ABA approval isn't something we point to when we are pushing an act," said Katie Robinson, an official at the Chicago-based NCCUSL.

But opponents say that without ABA support, UCITA is seriously wounded, if not dead. "Pushing it forward in anything close to its current form is like dragging a dead whale back to sea," said Bruce Barnes, an IT consultant in Dublin, Ohio. ▸

Timeline

1999: UCITA is introduced.

2000: Virginia and Maryland adopt it.

2001: Opponents organize and stop further adoptions. The ABA forms a committee to review the law. UCITA drafters agree to drop "self-help" remote turn-off provisions.

2002: An ABA committee labels UCITA too confusing and complex and calls for a rewrite. No states adopt UCITA.

2003: The ABA's governing body declines to back UCITA. A push for state adoption resumes.

DEAD OR ALIVE?

UCITA should be dead, but it remains alive because of the NCCUSL's foolish pride, says columnist Frank Hayes. **Page 50**

UCITA Background: To read *Computerworld*'s previous UCITA coverage, visit our Web site:

QuickLink a1690
www.computerworld.com

Cisco Expands Its Line of Intrusion-Detection Tools

BY MATT HAMBLEN

Cisco Systems Inc. this week plans to announce new intrusion-protection software and firewall enhancements, including functionality designed to lower IT staffing costs by drastically reducing false or irrelevant system-intrusion alarms.

Cisco officials said a major upgrade, Cisco Intrusion Detection System (IDS) 4.0, will accompany the rollout of new Cisco Threat Response technology that's aimed at reducing incidents of false intrusion alarms by 95%. The company will also announce upgraded management features for IDS 4.0, as well as an intrusion-detection sensor appliance and a second-generation version of the IDS software for its Catalyst 6500 switch.

In addition, Cisco will upgrade the software for its PIX Firewall appliances and unveil a virtual private network accelerator card that it said should provide performance improvements of up to 400% on networks that use the Data Encryption Standard and other specifications.

Cisco bought the Threat Response technology as part of its acquisition of Austin, Texas-based Psionic Software Inc. in October.

Vignette Corp., a developer of content management and portal software in Austin, has been testing Threat Response and hopes to deploy a working version soon, said Selim Nart, a network architect at Vignette. The software should help Vignette avoid having to hire more network management staffers to act on real alarms or to clear false ones, he said.

Nart estimated that 20 minutes' worth of intrusion alarms results in 20 hours of work for a network administrator. He said Vignette experiences a total of 90,000 intrusion alarms in its global network monthly. So far, Threat Response "has been very accurate," Nart said. "It helps us a lot on troubleshooting the real problems."

Threat Response, the improvements included in IDS 4.0 and the other features are examples of Cisco's continued efforts to improve its security capabilities, said Zeus Kerravala, an analyst at The Yankee Group in Boston. By acquiring Psionic and other vendors, Cisco has been able to put together a network security "ecosystem" that rivals such as Nortel Networks Ltd. and Alcatel can't match, he said. ▸

MORE INFORMATION

Visit our Security Knowledge Center online:

QuickLink k1600
www.computerworld.com

Data Analysis Vendors Add Supply Chain Tools

BY MARC L. SONGINI

SAS Institute Inc. is expanding its line of business-intelligence software in a bid to help users apply in-depth analytics to their supply chain processes — making it one of several data analysis vendors with initiatives of that kind.

Cary, N.C.-based SAS last week announced plans to ship two applications designed to exploit its analysis capabilities in the supply chain arena. The company also said it has set up a supply chain analytics consulting group to help companies install the applications.

Cognos Inc. in Ottawa and Hyperion Solutions Corp. in Sunnyvale, Calif., said they're also working to add supply chain analysis tools to their business-intelligence product lines. Scott Lawrence, director of analytic applications at Cognos, said the company's software will give users the ability to fully analyze their supply chain operations.

More Details

How Cognos and Hyperion Solutions are beefing up their supply chain tools:

COGNOS plans to release a manufacturing-specific supply chain application with support for functions such as analyzing bills-of-material costs and optimizing demand planning.

HYPERION aims to release by early next year supply-chain-ready templates that will let users of its analysis software do modeling and planning work without extensive customization.

Dennis McCarron, senior manager of business planning strategy at SAS, said the applications his company is developing will complement existing supply chain management systems, such as the ones sold by SAP AG and i2 Technologies Inc. The goal is to help users cut costs while optimizing their quality-control efforts, he explained.

To that end, McCarron said, SAS will offer a demand-intelligence package that provides an integrated view of inventory, price optimization and product demand processes. Companies will be able to use the software to tailor their supply chains to better meet market needs and to adjust pricing and promotions. The application is initially being developed for the retail and consumer goods industries.

SAS said it's also working on a manufacturing process analysis application to help companies find ways to improve product quality and reduce time to market. That product will be initially targeted at semiconductor and other high-tech companies.

Both modules are available on a limited basis now and are due for general release by year's end.

The demand-intelligence capabilities sound interesting, said Gary Keathley, materials manager at Alcon Inc.'s manufacturing plant in Houston. But he added that the eye care products maker customized its SAS applications to handle demand-analysis functions more than 10 years ago.

Alcon's SAS installation can take sales data, crunch the numbers and project future production needs at the Houston plant based on factors such as seasonality and customer needs, Keathley said.

The manufacturing process application could also be useful, but SAS officials need to better "pinpoint what they are trying to go after" with that product, he said.

While SAS already sells some supply chain analysis components, it's now creating an end-to-end offering that covers both the supply and demand sides of supply chain processes, said Bob Moran, an analyst at Aberdeen Group Inc. in Boston. The new software will let users examine how events at one point in a supply chain could affect other segments, Moran said. That could be a key capability for companies that try to get by with the thinnest of profit margins, he added. ◗

RELATED COVERAGE

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Cognos to Ship Browser-based Analysis App

In addition to its development of supply chain analysis tools, Cognos is readying the first fully Web browser-based release of its flagship business-intelligence software.

The company plans to announce the Cognos Series 7 Version 2 upgrade this week and ship it next month. Because it requires no client software, the new release can reduce administrative costs and headaches for corporate users, according to Cognos officials. They said it can also handle larger amounts of data than before and provide predictive analysis capabilities to users.

The latter feature will let users run forward-looking trend analyses instead of just querying historical data, said Michael Branchaud, a product director at Cognos. For example, a company could use the tool to project how a sales deal might affect inventory levels, enabling it to plan ahead by ordering more stock.

The new release is being designed to address usability issues, but its Web-based user interface has the same capabilities that Cognos built into the current Windows version, said Philip Russom, an analyst at Giga Information Group Inc.

– Marc L. Songini

Microsoft Plans Reporting Engine for SQL Server

BY MARC L. SONGINI

Microsoft Corp. last week announced plans to embed an analytical reporting engine in the upcoming 64-bit version of its SQL Server database, adding another element to the decision-support capabilities it offers to corporate users.

Currently, Microsoft supports the ability to launch online analytical processing queries as part of SQL Server 2000. But the new Reporting Services technology planned for the 64-bit release, which is code-named Yukon, will also let users create business reports and distribute them across corporate networks, said Sheryl Tullis, product manager for SQL Server.

Although the reporting engine is being targeted primarily at developers within corporate IT departments and at software vendors, end users will be able set up their own report parameters, Tullis said. The software will include Web services hooks for developing reports using Microsoft's Visual Studio .Net tool kit and .Net Framework programming model, she added.

In addition, it will be able to interoperate with any data repository that has OLE DB or Open Database Connectivity (ODBC) interfaces and to publish reports to Web browsers or Microsoft's Office desktop applications. Reporting Services is scheduled for initial release in a beta-test version of Yukon due by midyear.

Microsoft acknowledged that there will be some overlap between Reporting Services and reporting tools sold by business partners such as Crystal Decisions Inc. in Palo Alto, Calif. But Microsoft said in a statement that it will continue to provide partnership opportunities for other reporting tool vendors.

The tight integration promised among Microsoft's SQL Server, Reporting Services and server management software makes the new technology especially appealing to ProClarity Corp., a Boise, Idaho-based developer of business analytics software.

Money-Saving Move

ProClarity, a Microsoft partner and SQL Server 2000 user, is testing an early version of the Reporting Services software, said Clay Young, the company's vice president of marketing. ProClarity plans to roll out the reporting tools internally when the beta release becomes available, he added.

Young said ProClarity hopes to use Reporting Services to create reports that don't require further analysis after distribution, such as ones that detail the number of hits on its Web site. The company currently uses Crystal Decisions' software, but Young said ProClarity plans to standardize on Microsoft's technology to save money, since Reporting Services will be bundled as part of SQL Server licenses.

Microsoft's move makes sense as reporting tools become more of a commodity that decision-support vendors can embed into their products, said Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Daly City, Calif.

Microsoft should have no problem convincing users that it can develop reporting software that's technically sound, Greenbaum said. But it may be harder for the company to prove that it has reporting expertise in individual vertical markets, he added. ◗

Reporting Plan

The reporting tools that Microsoft is developing will:

- Be part of the **64-bit Yukon version** of SQL Server.
- Let users **create reports and distribute** them throughout a company.
- Include Web services hooks plus **ODBC and OLE DB interfaces.**
- Support **publishing of reports** in Web browser or Office apps.

BRIEFS

Visteon, IBM Sign Outsourcing Deal

Visteon Corp., an automotive parts maker in Dearborn, Mich., announced a 10-year IT outsourcing deal with IBM valued at about $2 billion. IBM will take over Visteon's mainframes, data centers, networks and help desk operations, and some application development work. Visteon, which was spun off from Ford Motor Co. in 2000, will continue to manage applications that support product development.

Dell Loosens Ties To Pacts With IBM

Dell Computer Corp. said it has largely ended two multibillion-dollar deals signed with IBM in 1999. A component supply contract that called for Dell to buy disk drives and PC monitors from IBM has become defunct following IBM's sale of those operations. Dell also de-emphasized an IT services partnership and now calls IBM Global Services for assistance only upon user request.

IT Trade Group Files XP Complaint

The Computer & Communications Industry Association (CCIA), a trade group in Washington that sided with the U.S. government in the Microsoft Corp. antitrust case, filed a complaint related to Windows XP with the European Commission. The CCIA claimed that Microsoft's bundling of various applications in XP violates European antitrust laws. Microsoft declined to comment.

Top Sprint Execs To Stay, for Now

Sprint Corp. said outgoing CEO William Esrey and President Ronald LeMay will stay on while it tries to free CEO-designate Gary Forsee from his contract with BellSouth Corp. in Atlanta. Forsee is currently BellSouth's vice chairman.

MARK HALL ■ ON THE MARK

Nokia Appliance Plugs E-mail Security Hole . . .

. . . and challenges competing devices, which, a company executive chides, "appeal to the lowest common denominator." Nokia Internet Communications, a U.S.-based business unit of Finland's Nokia Corp., will ship at the end of March its SC6600 e-mail security appliance to guard your network from any message laden with viruses, worms, spam, offensive language, sensitive data and **just about any digital nasty you can concoct.** A single SC6600 (the Nokia Message Protector, if you're a fan of marcom-speak) peers into files that have been zipped multiple times, decodes macros, analyzes executables, parses content and detects spam at a sizzling 120,000 electronic epistles per hour. Its performance is achieved, brags Dan MacDonald, vice president of product management and marketing, "because the [SC6600] is purpose-built to protect SMTP traffic flow." Competing boxes from say, McAfee, he says, are "just a **general-purpose computer that attempts to do too many things** at once," such as protect HTTP and VPNs as well as SMTP traffic. Worse, MacDonald claims, virus security firms have tried to force-fit their software approach into a hardware appliance, which he says needs to be designed from the silicon up, not the binaries down. As such, Nokia has partnered with Trend Micro Inc. for its virus software. The 1U (1.75 in. high) appliance will cost $16,000, plus the license for Trend Micro's virus protection. ■ If you're satisfied that your e-mail is safe and sound, it's time to consider **the gaping hole instant messaging (IM) bores into your network.** Not yours, you say. Fat chance. IM permeates 84% of businesses today, according to market researcher Osterman Research Inc., which surveyed 189 organizations. If you still doubt it, visit the Web site of San Diego-based Akonix Systems Inc. and download its free tool, Akonix Rogue Aware, which will enlighten you on just how pervasive IM is in your company. If what you learn scares you, Akonix CEO Peter Shaw hopes you'll buy Version 2.0 of Akonix L7 Enterprise, which **protects your IM traffic from viruses while enforcing corporate policies** on who can send what IM traffic with which IM client and when they can send it. Each of the IM gateways can handle 20,000 users and can be clustered for redundancy. Based on Windows server technology, the L7 Enterprise ships tomorrow with a starting price of $2,250. Look for an adapter to manage peer-to-peer traffic and a Linux-based version before the end of the year. ■ **Knock, knock. Who's there? Not content.** More than an unfunny joke, it's a sad situation when visitors arrive at your Web site and can't find what they're looking for. The search technology wizards at iPhrase Technologies Inc. have devised a "buried content reporting" tool that's now in the prototype stage for release sometime in the second quarter. What beta users are discovering is that the most coveted content has been deposited a minimum four or five clicks deep into their Web sites, which the MIT-schooled founders of iPhrase suggest makes for a compelling case for advanced search tools. **Duh.** ■ IP-based phone systems get another boost on March 3 when AltiGen Communications Inc. ships its Multichannel Contact Center for sales, service and help desk operations. Each 4U rack-mounted device can handle 128 chatty agents and costs $525 to $900 per user, depending on the applications purchased. The system **can link to legacy private branch exchanges or connect directly to your outside lines.** ■ Keith Raffle, chairman of UpShot Corp., still sounds a little bitter when he talks about Microsoft Corp.'s recent entry into the hosted CRM market. (**"I wonder what Microsoft is bringing to this party," he mutters.**) After all, UpShot dutifully adopted a pure .Net Microsoft technology, then those Redmond rascals try to take his business after he gave them his. Well, he's not going to simply roll over. Today, UpShot introduces a Multiprocess Management feature to its UpShot XE CRM for enterprises. The update improves customization of data views and provides simple drag-and-drop configuration of screens, among other enhancements. **The online CRM party keeps getting louder.** ▶

Improvements

Teros in Santa Clara, Calif., has not only changed its name this month from Stratum8 Networks (finally, a moniker update for the better), but it has also upgraded its Teros-100 Application Protection System. Version 2.0, which ships tomorrow, improves credit card and password security on Web sites and also tightens security zones around applications. Pricing for the product starts at $25,000.

HP Stays Itanium Course Ahead of Intel

BY JAIKUMAR VIJAYAN

Hewlett-Packard Co. this week will introduce an Itanium 2 chip set in a move that takes it another step closer to delivering its first high-end servers based on Intel Corp.'s 64-bit processor architecture.

The company will also detail plans to deliver the HP mx2 "daughter-card" technology that will allow it to combine two Itanium 2 processors and a large memory cache into a one-chip module.

The mx2 technology, code-named Hondo, will allow HP to double the number of processors it can pack into an Itanium server and will deliver better performance for applications that require CPU scalability, said Brian Cox, an HP product manager.

HP's new sx1000 chip set will allow the company to build systems much larger than current Intel chip-set technology permits, Cox said. With it, HP is on track to deliver the first Itanium 2-based 64-processor Superdome server in mid-2003, he added.

Because the sx1000 chip set is compatible with HP's PA-8800 RISC architecture, users will be able to upgrade from RISC to Itanium processors within the same unit. HP's Itanium Superdome systems will be able to run HP-UX, Windows and Linux in the same machine. Next year, the company will add support for the OpenVMS operating system on Itanium servers.

HP's mx2 daughter-card technology, meanwhile, will become available sometime early next year, well in advance of Intel's planned launch of a dual-core Itanium processor in 2005, Cox said.

HP is the only major systems vendor that's likely to ship high-end Itanium servers by year's end, analysts said. "But as co-developer of Itanium, that is only something to be expected from HP," said Terry Shannon, editor of the "Shannon Knows HPC" newsletter in Albuquerque, N.M. ▶

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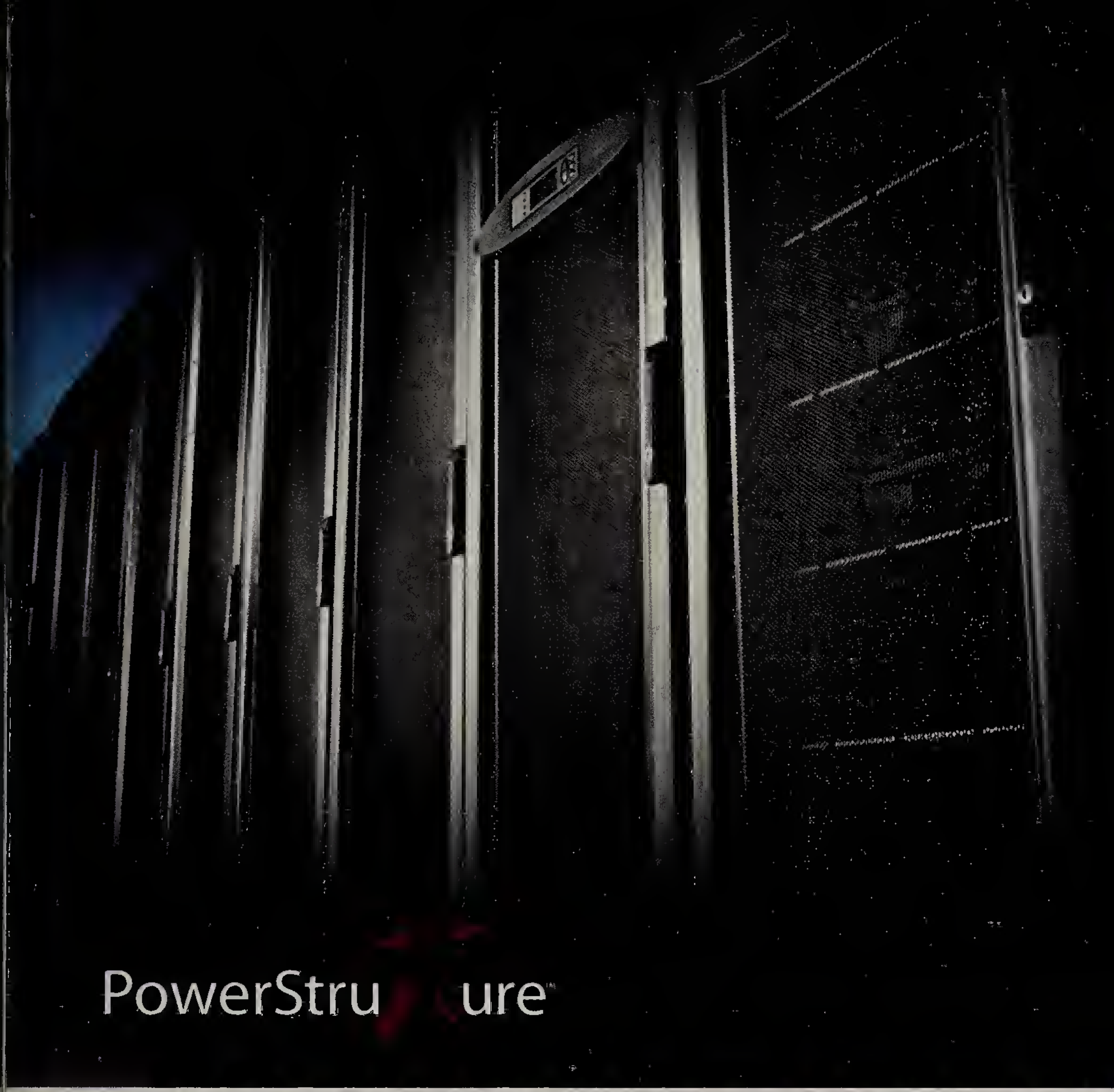

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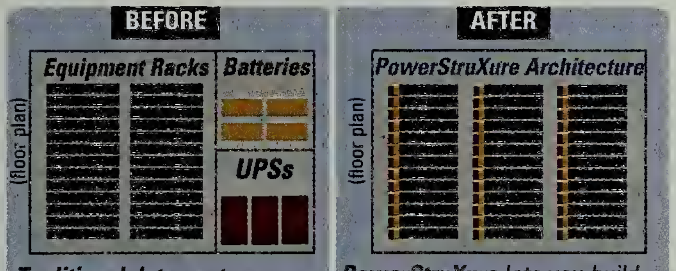

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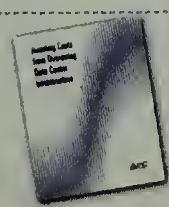

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Danish Bank Blazes Web Services Trail

Says performance overhead worth it

BY CAROL SLIWA

MARKING THE one-year anniversary of its Visual Studio .Net tools, Microsoft Corp. last week spotlighted Danske Bank A/S as a cutting-edge adopter of the Web services capabilities in its .Net Framework.

But the Copenhagen-based financial institution's Web services work extends well beyond its use of Microsoft technology. Danske Bank was plotting a services-oriented architecture to expose functionality from its mainframes, IBM WebSphere application servers and Microsoft servers long before Web services came into vogue.

Peter Schleidt, Danske Bank's executive vice president of group technology development, said the institution has already exposed about 200 services from those disparate systems and plans to launch another 500 services into production this year.

In the Top Echelon

Daryl Plummer, an analyst at Stamford, Conn.-based Gartner Inc., said that if they are indeed "true" services, they would place Danske Bank in the top 1% of IT departments doing Web services work. He defined a true service as one with a well-described interface to a system that can be called from an outside system.

"Most companies don't have that many services identified and exposed at this point," Plummer said.

The end result can be extremely useful. Schleidt cited a portal that customers and 7,000 financial and sales advisers use to access information drawn from the disparate back-end systems.

For instance, an employee can now access a unified customer-purchase record and correspondence history from the same interface, without having to call individual systems one at a time.

Schleidt said that three years ago, the bank recognized the need for an engine that would enable it to integrate functionality across its disparate systems.

Rather than tying functionality from one system to another one by one, the bank's developers write standards-based interfaces that expose functionality as services. They define and describe the services they have built and how those services can be called by other systems. That information is then stored in an internal registry that conforms to the Universal Description, Discovery and Integration standard, Schleidt said.

About 70% of the bank's developers work in Cobol, 20% with Microsoft's tools and 10% in Java, according to Schleidt. But a Java developer who wants to connect to a service exposed by a Cobol developer doesn't have to worry about the complexity of the other environments. "This is what Web services are all about — hiding complexity and exposing functionality," he said.

Two Approaches

When linking services from disparate systems, the bank takes a Web services approach and uses the Simple Object Access Protocol (SOAP) for message transport. But when connecting services between the same type of systems, such as mainframe to mainframe, it uses proprietary "bindings" for performance reasons, said Schleidt. He said the bank found that calling a mainframe function from the WebSphere environment takes 40 msec of CPU time using SOAP. Calling the same service from the mainframe, using proprietary protocols, takes 0.3 msec of CPU time. "It's a lot cheaper," Schleidt noted.

Mike Gilpin, an analyst at Cambridge, Mass.-based Giga Information Group Inc., said clients often report that it's five times slower to send data associated with a particular program call using SOAP vs. using a binary protocol.

Schleidt said Danske Bank decided a little performance overhead — but only 10%, he said — would be worth it because of the flexibility that Web services ultimately offer. But he added that he thinks the bank may eventually be able to eliminate the overhead by fine-tuning services that aren't working efficiently.

Danske Bank has yet to directly calculate return-on-investment figures for its Web services, but Schleidt said the boost in developer productivity will be more important because that will enable the company to deliver new, complex product packages more quickly.

Bank Benefits

Danske Bank's service-based development approach:

ENABLES integration of information from mainframe, Java and Microsoft systems.

ALLOWS developers to continue to use their existing skill sets.

BOOSTS developer productivity so they can deliver new, complex bank products more quickly.

Schleidt said it took three months to expose a stock-quote service, which was built with Microsoft's .Net tools, to Denmark's largest newspaper. But it took only three weeks to do the same for another partner, he said.

Those services represent the company's limited foray into external Web services. So far, the bulk of the bank's work has been with internal Web services — a recommendation Schleidt extends to his peers. ◗

GM CTO Outlines Web Services Strategy

Tony Scott, *chief technology officer of the information systems and services organization at General Motors Corp., spoke with* Computerworld *earlier this month about the automaker's plans for Web services technology. Excerpts from the interview follow:*

Do you feel Web services have been too hyped? I would not write off any technology that the likes of Microsoft and Sun and other large companies like IBM have invested hundreds, if not a billion, dollars or so in R&D. The likelihood is pretty good that it's going to hang around and be something significant.

At GM, we're interested in it from a number of different perspectives. We've all lived through the embryonic stages of the Web and all the EAI [enterprise application integration] tools and the big application packages. So we don't see Web services as the panacea, the end-all, be-all that's going to replace everything else.

But it does appear to fit in the Web development space, where we can take certain kinds of activities that we're embedding in each and every application we build today and externalize them as a service and only do, for example, maintenance and repair on that service in one place vs. in hundreds of applications.

Can you cite an example? Obviously, every car has a vehicle identification number. And there are dozens, if not hundreds, of applications in GM that use vehicle identification numbers for something, as a part of our normal business process. There's a whole set of business rules around vehicle identification numbers – good ones, bad ones, when the vehicle was made, its repair history, all kinds of things. And today we have to embed lots of business logic and rules in every single application that uses vehicle identification numbers. One of the things we are working toward is creating a vehicle identification number Web service that in effect will encapsulate all of the logic and business rules and so on – let's call them the big rules around vehicle identification numbers – so that you don't have to support and maintain that in hundreds of applications.

> **I'm more encouraged than I've been in a long time in terms of basic interoperability.**
>
> TONY SCOTT, CTO, GENERAL MOTORS CORP.

Do you feel encouraged by the potential for Web services to help you connect applications written using Java and Microsoft's .Net technologies? Yes. In our proofs-of-concept work, we've taken simple ideas, and we've done exactly that. We've married up what's shipping today among the various vendors, not totally without problems, but I'm more encouraged than I've been in a long time in terms of basic interoperability.

– Carol Sliwa

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Hospital CIOs Shy Away From Automating Medical Systems

Panel members cite high costs, IT risks of installing computerized applications

BY BOB BREWIN
SAN DIEGO

CIOS FROM hospitals large and small last week said they remain reluctant to deploy computerized physician order entry (CPOE) and automated medical records systems, despite a three-year push by 90 major U.S. employers for adoption of such systems to help eliminate medical errors.

Speaking on a CIO panel at the Healthcare Information and Management Systems Society's (HIMSS) annual conference here, Paula Anthony, who heads IT for the East Texas Medical Center (ETMC) Regional Healthcare System in Tyler, said she remains cautious about outside technology lobbying efforts such as the one for CPOE systems.

ETMC operates 13 acute care hospitals plus medical clinics in rural parts of East Texas. Anthony said the prospect of deploying CPOE technology for use by doctors, nurses and support personnel at the hospitals is "scary."

ETMC takes a conservative approach and "will not be in the forefront on technology," Anthony said.

The Leapfrog Group, a Washington-based health care consortium, last year estimated that systems for automating tasks such as prescribing medication and ordering medical procedures would eliminate a half-million medical errors annually — some of them fatal [QuickLink 29106]. The consortium was formed in 2000 by the Business Roundtable, a Washington-based organization made up of CEOs from Fortune 500 companies.

Kaiser Permanente Health Plan Inc., the largest nonprofit health maintenance organization in the U.S., this month said it plans to spend $1.8 billion during the next three years to roll out a paperless medical system that includes CPOE capabilities [QuickLink 36200].

Not a Simple Process

But Warren Chandler, CIO at St. Vincent's Health System in Jacksonville, Fla., said his 528-bed hospital is "a long way from going paperless." Developing and deploying a CPOE system may sound like a simple process, but it's not, Chandler said. "There are a lot of costs and risks," he noted.

Chandler said a good first step toward paperless operations is development of a clinical data repository, which could serve as a baseline system for CPOE and other automated medical applications.

Jeff Cooper, CIO at Henry Medical Center in Stockbridge, Ga., also said health care institutions should take a "building-block" approach to the development of CPOE systems. For example, IT managers could start by putting patient records in electronic form, he said.

Health care IT managers need to get involved with local business organizations to let them know what is realistic in terms of developing CPOE systems, said Pamela McNutt, CIO at Methodist Hospitals of Dallas, which operates a 478-bed hospital, a cancer clinic and four other facilities.

Despite their concerns about CPOE technology, the CIOs who took part in the panel discussion said they have made their systems compliant with the federal Health Insurance Portability and Accountability Act's (HIPAA) IT security and privacy mandates, which go into effect in April.

Meeting the HIPAA mandates was "very expensive, but we're ready for it," Anthony said. ETMC's biggest HIPAA-related expense was the cost of having lawyers review its privacy and security plans, not the cost of new technology, she added. ▶

CIOs on CPOE

Members of the CIO panel made the following points about CPOE systems:

- The technology is too complex for fast rollouts, and projects are expensive and can involve too many IT risks.
- Health care companies should take a building-block approach and start by automating clinical data or patient records.

NASA Teams With Private Sector to Improve Software

Goal is to build fail-proof systems

BY PATRICK THIBODEAU
WASHINGTON

NASA's mission system software is considered to be among the best-engineered in the world. But in the aftermath of the 1999 Mars Polar Lander crash, which was caused by a software bug, NASA officials acknowledged that a long-term fix was needed in order to build systems that don't fail. And the agency's subsequent efforts may ultimately help all IT managers.

NASA played a leading role in the creation last year of the Sustainable Computing Consortium (SCC), which includes companies such as FedEx Corp., Pfizer Inc., Microsoft Corp. and Oracle Corp.

The goal of the SCC, which is based at Carnegie Mellon University in Pittsburgh, is the Holy Grail of software design: creating software that does what it's supposed to do, no matter what. It's called "high dependability" and refers to systems that tolerate hardware faults well, maintain a high level of security during attacks and are always available.

For an anlogy, think of the field of structural engineering, in which there are extensive building codes and precise measures for determining stress and loads. Right now, there no similar measures for quantifying the reliability of software, particularly in interconnected systems. "Imagine if there is no building code, where would you start? That's where we are with software," said SCC head William Guttman, a professor of economics and technology at Carnegie Mellon.

The Feb. 1 crash of the space shuttle *Columbia* brought renewed attention to the highly complex computer systems and software used by the space agency. While the cause of that disaster has yet to be determined, there's no doubt that a software bug caused the Mars Polar Lander to crash. For NASA, that crash was "an important watershed event" that prompted the agency to broaden outreach efforts to improve software design, said Henry McDonald, who headed NASA's Ames Research Center in Moffett Field, Calif., until last November.

Among systems that can't be allowed to fail are those that MasterCard International Inc. uses for its smart-card systems. Software code for those systems is inspected line by line and tested in a process that can take up half of the card development effort, particularly because of the need for high security, said Terry Stanley, the company's vice president of smart-card platform architecture.

But if vendors built better products, costs would be reduced, Stanley said. There are agreed-upon tests for chips, but that's not the case with software applications, he said. The IT industry is recognizing that application standards are needed "not only to cut down the cost of security testing, but to also reduce the time frame," he said.

MasterCard worked with SCC member Cigital Inc., a Dulles, Va.-based software engineering firm, to analyze and test its systems. One huge problem engineers face in checking systems, said Jeffery Payne, president and CEO of Cigital, is the ability to determine mathematically the reliability of an assembled system.

"This is a long-term, tough-nut problem," he said. ▶

JUST THE FACTS

The SCC is a collaborative effort involving universities, companies and government agencies.

WHAT: Develop standards and measurements **that allow engineers to accurately** determine software reliability and security.

WHY: Major IT vendors **emphasize dependability and security,** but users currently have no way to ascertain software quality.

HOW: Conduct research to **develop systematic approaches** to assessing risk and value.

WHERE:
www.sustainablecomputing.org

WHY WE'RE IN

A FedEx IT exec discusses her company's involvement with the SCC:
QuickLink 36371
www.computerworld.com

MILITARY X-RAY NETWORK

At the HIMSS conference, U.S. Army officials detailed an IP-based network that routes X-rays for remote diagnosis:
QuickLink 36281
www.computerworld.com

Companies Expected to Boost Offshore Outsourcing

Pressure to cut costs drives trend, analyst firms say

BY JAIKUMAR VIJAYAN

WORKFORCE ISSUES

Demand for offshore outsourcing services will continue to grow substantially over the next several years, as companies try to squeeze more value out of every IT dollar they spend, according to recent reports from three major analyst firms.

In a report released last week, Meta Group Inc. in Stamford, Conn., predicted that offshore outsourcing will grow more than 20% annually, pushing it from a $7 billion market today to about $10 billion by 2005. Almost all application outsourcing services will include an offshore component, and the market will reach $15 billion by 2007, the Meta report added.

The focus on lowering IT costs is accelerating the use of offshore services, according to a Gartner Inc. report released earlier this month. Although companies are tapping offshore vendors primarily for application management purposes, demand is also emerging for business process outsourcing and infrastructure management services, Gartner said.

"There is a growing sense that IT infrastructure management is something that can be packed up in a box and shipped off to someone who can do it more efficiently and at a lower cost," said Bruce Caldwell, an analyst at Gartner, which is also in Stamford.

"People are looking to offshore as a low-cost and immediately available alternative" to buying and deploying such technologies themselves, Caldwell said.

Overland Park, Kan.-based Meridian IQ LLC, a subsidiary of Yellow Corp. that provides transportation management services, expects its use of offshore services to increase, said CIO Dan Bentzinger.

Driving that trend are the same three factors that led Meridian to first outsource services to Infosys Technologies Ltd. in Bangalore, India, in 1998: speed to market, quality and cost of services.

Infosys has given Meridian the ability to quickly acquire reliable IT resources to deploy new services, while also giving it the flexibility to ramp down when they aren't needed, Bentzinger said. "Meridian is in an upswing right now, which means we are going to be growing our relationship," he predicted.

Even though IT budgets are shrinking or remaining flat in the face of the recession, the amount of money being allocated to offshore outsourcing is increasing as a percentage of overall IT spending, said Prasad Thrikutam, an Infosys regional manager in Dallas.

What They Say

META GROUP

Offshore outsourcing will grow from $7 billion currently to more than $10 billion by 2005.

GARTNER INC.

Offshore application management ranked as the highest growth opportunity in 2003 in a survey of 36 outsourcing vendors.

FORRESTER RESEARCH

Respondents in a survey of 145 IT decision-makers at North American companies rated offshore providers better than U.S. firms 67% of the time in terms of quality and timeliness.

In fact, one offshore services company, Cognizant Technology Solutions Corp. in Teaneck, N.J., reported record growth in 2002, as annual revenues rose to $229 million from $178 million in 2001.

Increasingly, offshore companies are being viewed not just as a "tactical cost-saving option but as more of a strategic proposal," said Ram Mynampati, chief operating officer at Satyam Computer Services Inc. in Hyderabad, India. This is reflected in the higher-end jobs Satyam is being asked to do for its U.S. clients, Mynampati said.

But project management remains a major challenge for many companies that outsource to offshore vendors, according to a recent survey by Forrester Research Inc. in Cambridge, Mass., the results of which were also released earlier this month.

One-third of the respondents in the survey of 145 "decision-makers" at North American companies said they use offshore services and plan to spend more money on them in the future, Forrester said.

But "18% of respondents using offshore providers reported a major challenge in measuring performance, while 20% have serious issues specifying the work needed to be done," the Forrester report concluded. ▶

Nortel, C&W Push New Capabilities on IP Networks

VOIP, global videoconferencing among targets

BY MATT HAMBLEN

IP networks continue to get the attention of vendors looking to use the technology to support advanced functionality such as voice over IP (VOIP) and videoconferencing.

Nortel Networks Ltd. today will announce plans to sell IP voice networking products to telecommunications companies and then help them market services based on the technology to corporate users as well as consumers.

Separately, Cable & Wireless PLC (C&W) last week announced that it's joining forces with a small IP-based videoconferencing vendor, Wire One Technologies Inc.

London-based C&W said it would use its global IP virtual private network (VPN) capabilities to support Glowpoint, a videoconferencing service offered by Hillside, N.J.-based Wire One.

Nortel's announcement comes at a time when struggling telecommunications carriers need to find new sources of revenue and want to offer their customers services that can help lower networking costs, industry analysts said.

Brampton, Ontario-based Nortel will announce a series of managed services designed to provide businesses, through telecommunications carriers, with the ability to migrate voice networks line by line to VOIP technology and to use Web-based routing and call management tools. The use of VOIP should reduce voice communications costs by up to 25%, Nortel said.

Nortel's initiative should mean corporate IT managers will see lower costs for IP-based voice connections, said Christin Flynn, an analyst at The Yankee Group in Boston. Many carriers have been involved in IP voice trials and should be ready to invest in deployments of the technology this year, she said.

C&W and Wire One said their deal will give C&W a reliable videoconferencing partner and let Wire One gain a global reach for U.S. companies that want to reliably and inexpensively provide videoconferencing services to business partners and branch offices in other countries.

Summit Partners, a private venture capital firm in Boston, uses Glowpoint to support 12 hours of boardroom videoconferencing between offices in Boston, London and Palo Alto, Calif., each week. Mike Veilleux, junior assistant administrator for networking at Summit, said the partnership between C&W and Wire One could produce an improvement in the London connection, which sometimes has lower quality than the others.

Calling Carriers

Nortel's Succession Service suite for VOIP capabilities over VPNs:

IS DESIGNED to help telecommunications carriers offer corporate users managed VOIP services that can reduce voice communications costs by 25%.

IS BASED on its Succession Communication Server 2000 and Server 2000-Compact packet-switching devices.

INCLUDES services that support line-by-line migrations of corporate voice systems to IP network technology.

ADDS Web-based routing and call management capabilities for IT managers, plus Web-based videoconferencing and collaboration tools.

About 10% of all videoconferencing service providers use IP, and IP-based videoconferencing service can cost less than videoconferencing carried over circuit-switched networks, according to Roopam Jain, an analyst at Frost & Sullivan Inc. in San Jose. ▶

ADDITIONAL INFO

To read more on this topic, head online to our Networking Knowledge Center:

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BRIEFS

IBM Stops Linux On Itanium Project

IBM has stopped development efforts aimed at tuning Linux to run on servers based on Intel Corp.'s 64-bit Itanium processors. A small group of developers that was doing the work is now focused on tying the open-source operating system to IBM's own Power4 chip technology. IBM has said it will support Intel's new Itanium 2 chip in servers but has yet to ship such a system.

CSC, IBM Sign J.P. Morgan Deal

Computer Sciences Corp. (CSC) in El Segundo, Calif., announced a seven-year deal with IBM under which the services firm will continue to manage some of J.P. Morgan Chase & Co.'s servers. CSC is one of four vendors that had been doing outsourcing work for New York-based J.P. Morgan Chase, which in December signed a $5 billion contract with IBM. CSC said its subcontract is expected to be worth $500 million.

BEA Announces Upgrade, Purchase

BEA Systems Inc. released an upgrade of its Tuxedo transaction-processing software that adds Web services support and tighter integration with the company's WebLogic middleware. San Jose-based BEA also said it has acquired Redwood Shores, Calif.-based CrossLogix Inc., a developer of end-user access authorization software. Financial terms weren't disclosed.

Short Takes

MICROSOFT CORP. reissued a software patch for Windows NT 4.0 that was pulled earlier this month after users said the security fix was crashing their systems. . . . UNISYS CORP. signed a 10-year outsourcing agreement valued at about $450 million with London-based Royal & Sun Alliance Insurance Group PLC.

Continued from page 1

Sun

helping users pool, share and manage heterogeneous server, storage and network resources. Sun will also emphasize the role of its iForce partner centers, where users can test and specify their technology requirements for Sun to custom-configure for them.

The goal of these efforts is to reduce complexity, improve utilization and reduce the costs associated with deploying and managing IT products, Sun CEO Scott McNealy said.

Sun's strategy appears to be striking a positive chord with some users.

"We like the idea of dealing with vendors who are willing to take responsibility for a broader spectrum of services," said Jim Stock, CIO of The Landrum Co., a Columbia, Mo.-based holding company that owns four banks.

The company moved its core financial applications from a mainframe to Sun servers two years ago, not only because the technology offered better price/performance, but also because it was easy to implement, according to Stock.

Questerra LLC, a Charlottesville, Va.-based provider of mapping services, has standardized on Sun servers, storage and services for running its core applications. Sun's approach of offering more integrated technology modules is a good one because it eliminates the need for companies to integrate best-of-breed technologies themselves, said Tim von Kaenel, chief technology officer at Questerra.

"The notion that Sun has of integrating all these disparate technologies into one platform allows for computing on demand, storage on demand and services on demand," Kaenel said.

Sun's efforts address a growing area of concern for large users, said Cathy Hotka, former vice president of IT at the National Retail Federation and now principal of Cathy Hotka & Associates, a Washington-based consultancy for retail IT operations.

"The complexity involved in making many disparate products work with one another is a major concern" for large corporations, Hotka said.

"Many in the technology community have underestimated the number of kludge bridges that end users have to create" to make this happen, she said.

Great Expectations

As a result, there's growing demand from users for more modular and interoperable products, said Jean Bozman, an analyst at Framingham, Mass.-based IDC. "The idea that systems vendors play a role in assisting customers in integrating their technology is gaining," Bozman said.

Cingular Wireless is testing N1 technology in its Alpharetta, Ga., data center as part of a move to improve resource utilization and management. Under a multiphased approach, Cingular will use Sun's N1 products to pool Unix servers, storage equipment and network systems from multiple vendors and share the resources.

The goal is to get "greater value for every IT dollar that we spend," said Victor Nelson, vice president of IT at Cingular. Eventually, such an integrated IT infrastructure will also provide a base for delivering on-demand IT services, Nelson said.

Sun's strategy is a credible one that draws on its strengths in the network computing arena, said Joyce Becknell, an analyst at The Sageza Group Inc. in Mountain View, Calif. Sun's biggest challenge will be to convince users that it can really deliver multivendor interoperability, even as it continues to shun broader adoption of Wintel and Linux technologies in its own product lines, she said.

"They've got to show that they can play nicely with the other kids in the sandbox," Becknell said. ◆

McNealy: 'Let Us Run the Machines'

Sun CEO **Scott McNealy** last week spoke with *Computerworld* editor in chief Maryfran Johnson and reporter Jaikumar Vijayan about the company's direction and the changing role of CIOs. Excerpts from that conversation follow:

How is Sun the systems company today going to be different five years from now? Will it be Sun the services company? I think we will be selling more of our products as a subscription. We'll be selling more of our products through service providers and less to end users. And we'll be selling our products more integrated while still integratable.

There's going to be more stuff out there through the open-source community or that we'll offer through acquisitions. We'll have more pieces of the Lego blocks that you use to build network computing.

You say Sun is out to reduce complexity and make data centers easier to run. But then you say customers should let Sun run those data centers for them because they're so complicated. Aren't those two conflicting messages? We're saying that if you must have your own data center, let us run the machines. The right answer is to go to the Sun Tone service provider, who will host the machine, put it in their data center, connect it to the network and run it on a 7-by-24 basis. Then we'll go to the service providers and say, "Let us manage the machines in your switch room. You manage the service, but just let our person touch the machine. That'll be a very small percentage of the head count in your data center."

What IBM is saying is, "Let us just take the whole thing." They want to do the management consulting, the architecture, the hosting, the equipment purchases, all of it.

You've spoken about a new wave of CIOs. Who are you referring to? Sun's Bill Howard is an example of a new-wave CIO. He understands that his job is not managing data centers or the network for us. The CIO shouldn't be worried about assembling computers, or running data centers, or managing the network, or getting the printing stuff to work.

So, what does he spend all his time doing? He's building a world-class LDAP directory registry implementation that will have every employee, customer, reseller, shareholder and piece of equipment in the Sun community in a directory with a profile for each one, across all our business processes. That job alone will keep every CIO on the planet solely focused on being chief information officer. The old-style CIOs were all mechanics. They tended to buy their 10-speed bicycles and pay extra to have them unassembled.

What do you say to the analyst community when it makes dire predictions about Linux being Sun's undoing? They just don't get it. But that's all right; they haven't gotten it for 21 years. If I managed the company by analysts, we never would have started Sun, and I'd have killed Unix every year for 21 years. Right now, HP and IBM are reading the analyst reports saying how Linux is going to happen, and they're abandoning their Unix customers.

AT GREATER LENGTH

For an expanded version of this interview, visit our Web site:
QuickLink 36276
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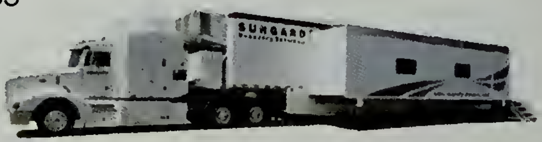

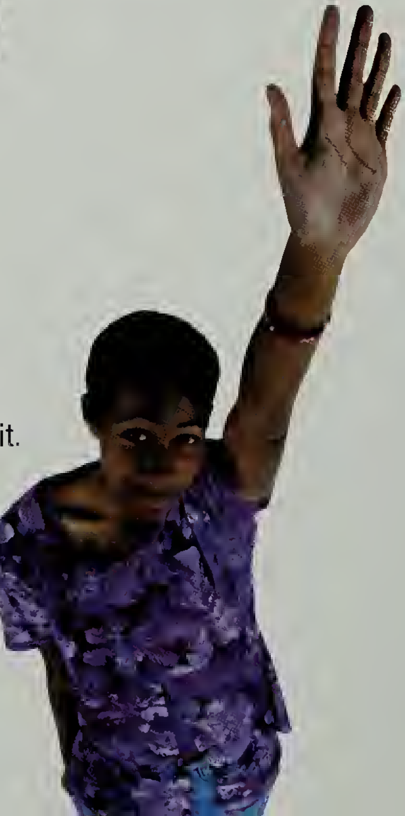

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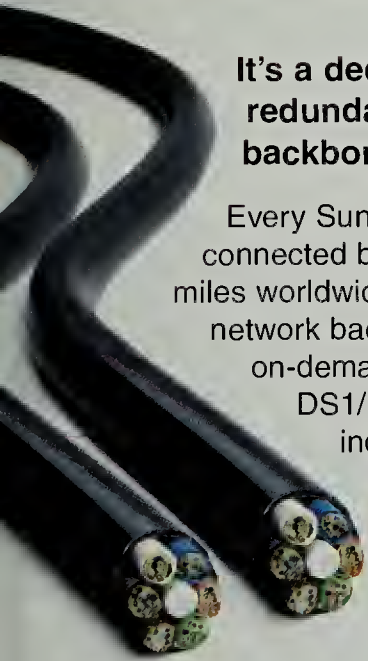

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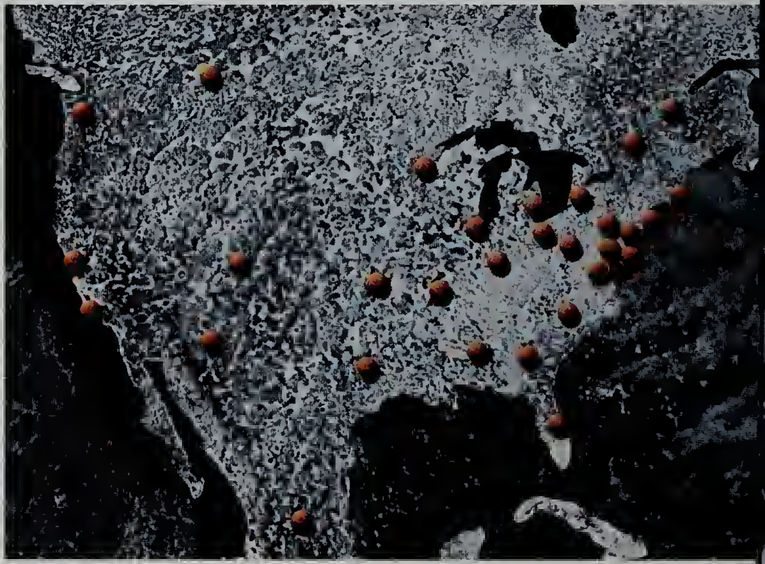

Every day, we help ensure that over 10,000 clients worldwide have uninterrupted access to their business-critical information. They count on us to supply the people, technology and infrastructure necessary to provide multiple points of access to information, flexible alternate workplace options for their employees, and updated continuity plans and systems to meet their future technology needs.

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*Source: Dunn & Bradstreet's MDDI

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Merger Wave Hits Energy IT Vendors

BY THOMAS HOFFMAN

A recent flurry of mergers between energy industry software vendors and IT services firms has some technology managers worried about the potential impact of the deals on their companies.

For instance, Eugene Zimon, CIO at NStar, a Boston-based utility and energy-distribution company, is closely eyeing CGI Group Inc.'s plans to acquire rival Cognicase Inc. In early 2001, Cognicase bought M3i Systems Inc., from which NStar had licensed outage management software. The CGI/Cognicase deal would be "the second ownership change within a year, which requires a lot of new relationship-building on our part," Zimon said.

Product delivery and support of the software developed by M3i has improved since Cognicase took over that company, Zimon said. But, he added, the constant changing of the guard "continues to be a big concern among senior management here."

Meta Group Inc. last month warned that the acquisitions might bring greater financial stability to vendors but that support for some products could end if the companies involved in a merger offer similar software.

For example, Meta analyst Rick Nicholson said there's some duplication of products between Spokane, Wash.-based Itron Inc. and Silicon Energy Corp., an Alameda, Calif.-based energy management systems vendor that Itron agreed to acquire last month.

Pending Deals

Itron expects to complete its purchase of Silicon Energy this month. Meanwhile, CGI last month wrapped up a tender offer for Cognicase and said it had received sales pledges for nearly 97% of the stock issued by that company, which, like CGI, is based in Montreal.

Two other acquisitions are in the works. American Management Systems Inc. in Fairfax, Va., signed a deal to sell its utility-focused IT consulting business unit to Wipro Ltd. in Bangalore, India. And SunGard Data Systems Inc. in Wayne, Pa., plans to buy Caminus Corp., a New York-based vendor of energy-related applications, although SunGard this month said the U.S. Department of Justice's antitrust division has asked for more information about the deal.

Kevin Walsh, an IT manager at Exelon Power, the electricity-generation division of Chicago-based Exelon Corp., said he doesn't use software from the vendors involved in the deals. But the mergers have him worried about the viability of other software vendors that target energy businesses, he said. ◗

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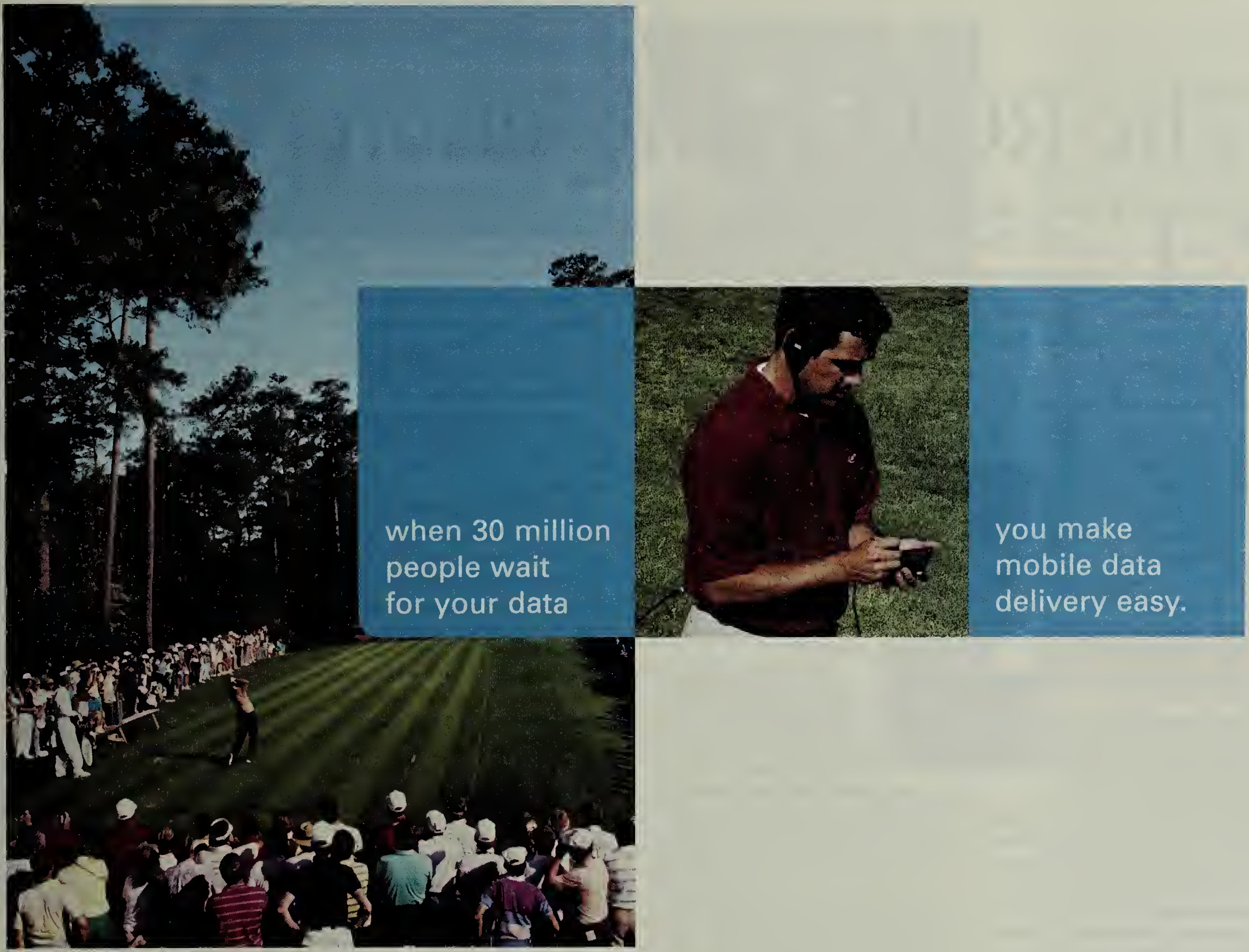
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MARYFRAN JOHNSON

The ROI Conversation

"THERE ARE many ways to count," says a CFO friend of mine. And what could be more true when it comes to measuring ROI? Those three magic letters now embody the myriad ways in which we measure IT effectiveness. We are obsessed, in these days of budget starvation, with proving that pricey IT projects will put meat on the corporate bones.

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This has not only spawned another branch of IT consulting specialties, complete with elaborate ROI scorecards, calculators, benchmarks and overengineered methodologies. It has also reawakened interest in applying to IT projects a wider array of standard financial measures such as net present value, internal rate of return and others.

"A lot of the best practices in managing a technology function can be stolen from the business playbook," says John McKinley, the departing chief technology officer at Merrill Lynch [QuickLink 36085]. "Ultimately, if you can't measure it, you can't improve it."

So, what are the many ways to count the ROI of your IT investments? We've rounded them up and spelled them out in this week's Knowledge Center ("Do the Math!" starting on page 21). This in-depth guide for CIOs and IT managers takes a blow-by-blow look at the most popular metrics to consider as you hoist your projects onto the scales of business judgment.

We also conducted a survey on this topic on *Computerworld.com* last month, and the majority of the 113 respondents confirmed that they are indeed doing ROI analyses regularly these days. Yet skepticism about these metrics still runs high. "As we say in IT," one CIO quipped, "I don't believe in any numbers I haven't massaged myself." About half of our respondents said they're ambivalent about the usefulness of ROI measures, with the majority favoring the simpler but more limited "payback period" metric over the more complicated financial formulas.

As I read the stories (and struggled valiantly through the math), I detected a distinct undercurrent flowing through the most successful applications of ROI metrics. It was the ROI *conversation*. The most important change taking place isn't in the application of anybody's mystical mix of metrics. It's in the discussions taking place among the business, financial and IT folks as their companies cobble together the best approach.

Those conversations also revealed some useful lessons, including:

Don't count on any single metric. At Gaylord Entertainment, the CIO uses the simpler measure of payback period for projects of less than $100,000, but he turns to more heavyweight financial metrics like discounted cash flow for the bigger deals.

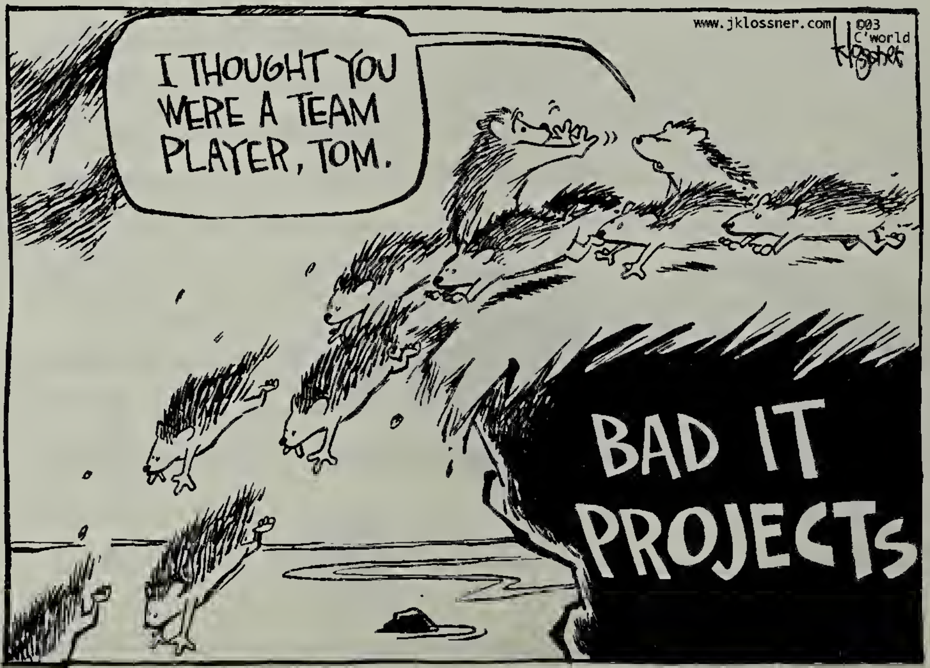
Conserve your ammunition. Don't squander a powerful ROI rundown on every project in sight. Save it for the top 10% to 20% of your most vital initiatives.

Customize like crazy. Develop your own set of metrics, and pull your vendor and consulting partners into the game. If your suppliers can't contribute any hard numbers or sensible metrics, you have to wonder, "What good are they?"

Favor simplicity. If it takes more than a few weeks to evaluate a project, your method is too complex. CIO Catherine Kozik at Tellabs factors in two years of fully loaded IT costs and a few other key measures that map to the company's strategic goals. "If you focus just on the ROI calculation, then you're playing liar's poker," Kozik points out. "The biggest liar is going to win, and that's ultimately not a successful business practice."

Amen to that.

Let the conversation begin. ◗

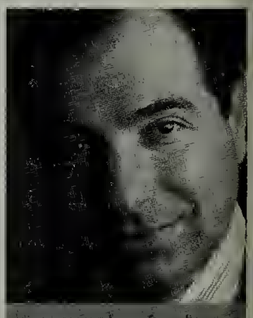


PIMM FOX

Leaders Need Vision

WHEN Hewlett-Packard announces its quarterly earnings later this month, analysts and customers will be looking for further evidence that the Compaq merger is bringing the benefits that Carly Fiorina promised when she aggressively stumped for the deal in the fall of 2001. So far the results look promising.

HP surprised Wall Street in the previous quarter by reporting a profit of 12 cents per share during one of the most difficult times in history for IT vendors. And while consulting revenue is off and customer support revenue is flat, there's evidence that HP's managed services and outsourcing operations are growing.



PIMM FOX is a freelance writer in San Francisco. Contact him at **pimmfox@pacbell.net.**

So where's the chorus of praise for Fiorina?

The media pilloried her — though there were some exceptions [QuickLink 23260] — for dragging HP toward an unworkable destiny within a decaying industry. They lambasted her for being blind to the founding vision of William Hewlett and David Packard, sacrificing jobs and the company's very existence for the purportedly ill-conceived plan of combining with Compaq.

Instead, her strategy is winning out. In his recently published book, *Perfect Enough: Carly Fiorina and the Reinvention of Hewlett-Packard*, George Anders reveals several things about Fiorina and her drive and character that should serve as lessons for all would-be leaders.

First, you must have a vision of what you want to accomplish. That sounds pedestrian, but Walter Hewlett, who opposed the merger, misjudged the strength of Fiorina's vision and lacked an alternative one — and lost his battle with her.

Second, you must have the commitment to see your vision through. Fiorina clearly was committed to the merger. At one point, the investor vote to approve the merger hung in the balance. It would have been easier for her

Looking Deeper, Reaching Farther

An intelligent network infrastructure featuring Cisco routers enhances the **value of IT investments** across the extended enterprise.

Successful companies run on information. It's that simple, and this reality drives unprecedented demands—and opportunities—for the people at the wheel of the enterprise network. Consider the case of one Global 100 manufacturer: With four technical assistance centers, a dozen regional offices, and more than 300 independent dealerships across the U.S., it's no simple feat to keep the bits flowing.

Yet flow they do, and not just in the form of data. By deploying high-performance, feature-rich Cisco routers at key sites, the company was able to extend IP telephony services securely across its wide-area network. As a result, they cut the cost of calls to the technical assistance centers by eliminating the need for separate phone services, increased employee productivity by reducing the amount of time spent searching for information, and improved customer service by ensuring everyone is up-to-speed on products and services.

Is it the Network, or the Application? Yes. Because the applications that are transforming business today are completely reliant on the enterprise network. By investing in an intelligent network infrastructure, companies create a highly secure, robust foundation for any number of applications, and even help improve performance of those applications for users throughout the company. And that allows them to reap a greater return on countless IT investments—past, present, and future.

High Availability

These days, it's hard to distinguish the network from the company. If one stops working, so does the other. That's why networks based on equipment from Cisco Systems offer unsurpassed availability, and, just as importantly, unsurpassed resilience in the face of interruptions.

To maintain productivity—and by extension, profitability—networks must be available all the time, providing employees with global, around-the-clock access to business applications and information, while ensuring appropriate internet access.

And since a network is only as reliable as its weakest link, all segments must be resilient enough to immediately bounce back from unexpected connection, component, or power failures.

To some extent, availability depends on the overall design of the network. In many cases, companies will deploy dual routers with the Hot Standby Routing Protocol that Cisco pioneered, enabling one device to seamlessly take over if the other one fails.

But availability also hinges on the design of the individual routers themselves. That's why Cisco builds layers of redundancy and resiliency into the hardware, from backup processors and power supplies to hot-swappable line cards.

Such safeguards work in tandem with Cisco IOS® Software features, including several recent enhancements collectively known as Globally Resilient IP, or GRIP. Cisco Nonstop Forwarding with Stateful Switchover, for example, enables a router's primary and backup processors to synchronize state information. That way, if a hardware or software problem knocks out the primary processor, the backup processor will pick up where it left off, without needing to reboot the system or line cards, and without losing a single data packet.

And because Cisco IOS Software runs from the enterprise backbone to the outermost reaches of the WAN, these capabilities can increase the availability of every segment of your network, and increase the productivity of every branch of your company.

Cisco Systems

Advanced Quality of Service

Imagine a city with wide roads and plenty of lanes, but no traffic lights. Things might flow smoothly enough at 3 a.m., but come rush hour, the resulting free-for-all would inevitably leave some motorists stranded in gridlock.

On the highways and byways of corporate networks, quality of service, or QoS, brings order and control to the bare asphalt of bandwidth. By prioritizing traffic, QoS ensures your most important applications and users get the bandwidth they need. For example, even slight delays in IP voice traffic will impact sound quality. But if an e-mail gets held up for a few seconds, no one will know the difference. So instead of just letting these applications compete for bandwidth, QoS mechanisms step in to direct traffic, waving voice and video packets through while the e-mail momentarily waits behind metering lights.

By establishing priorities and policies that recognize such distinctions, companies can better meet the needs of all users and applications. The alternative is to blindly throw more bandwidth at every performance problem that comes along, an unrealistic expectation in these tough economic times. QoS tools provided by Cisco Systems allow our customers to meet the business requirement to do more with less.

An intelligent infrastructure based on Cisco switches and routers provides a level of QoS sophistication that is simply unmatched in the industry. To provide true end-to-end QoS, Cisco routers classify and mark both inbound and outbound data packets, inserting tags that tell other network devices how traffic should be handled. As packets move across the network, policing and shaping mechanisms regulate the flow of traffic to ensure policies and priorities are enforced.

At the first sign of bottlenecks, congestion avoidance features take active steps to clear the way for the most vital data. Weighted Random Early Detection, for example, selectively drops packets based on IP precedence to keep high-priority traffic flowing.

At the same time, advanced QoS features lend networks greater flexibility, making it easy to adjust to changing requirements and priorities. So easy, in fact, that policies can shift according to time of day, accommodating different business needs and patterns of network usage.

When you deploy Cisco high-performance routers, you enable the intelligent movement of information across the WAN, seamlessly and securely linking multiple networks. IP communications, optimized content and application delivery, and embedded security features ensure you can safely deploy Internet business solutions such as e-learning, executive communications, customer relationship management applications, and more.

These solutions can be extended to local, remote, or even mobile workers, increasing the overall value of technology. You can create tighter feedback loops, reduce transaction costs, and make more informed decisions on a global level, making your company more productive and profitable.

For many organizations, the return on investment can be quite rapid. As Colonel Bill Hose of the Minnesota National Guard noted after deploying IP telephony over a Cisco intelligent infrastructure, “We’re planning to expand our multimedia collaboration applications like videoconferencing, and with the money we save on telecommunications bills and network administration, we can also afford to put more money into bandwidth for our end users.”

Understanding and Managing the Data on Your Network. Through the combination of high-performance routers and multilayer LAN switches, an intelligent infrastructure is able to utilize not only the Layer 2 header information attached to every data packet, but also Layer 3 IP address information, Layer 4 port information, even Layer 5 through 7 content and user information.

Cisco’s portfolio of routers – including the Cisco 7200, 7300, 7400, 7500, and 7600 series routers pictured above – provides the flexibility, versatility, scalability, and feature richness to enable new applications and services.

By looking deeper into streams of data, an intelligent infrastructure gains a more complete understanding of all the traffic flowing through and between networks. It can classify and mark traffic based on users and applications, and then use this information to carry out whatever policies and guidelines you set.

Cisco's portfolio of routers–including the Cisco SOHO, 800, 2600XM, 1700, and 3700 series routers pictured above–offers companies the ability to deploy advanced applications throughout their networks.

You can establish priorities, control and conserve bandwidth, and manage access to optimize employee productivity and to suit the unique needs of your company. You can adapt to changing requirements, from a routine shifting of priorities based on time of day to the deployment of new applications across the LAN and WAN. And you can extend robust, secure network services to partners, suppliers, customers, and employees anywhere in the world.

Improving Productivity—The emergence of this global, scalable approach to networking comes at an opportune time. Over the past several years, network-enabled applications have emerged as the leading driver of corporate productivity. At the same time, they've reduced the cost of doing business. In a study sponsored by Cisco Systems, researchers at the University of California at Berkeley, The Brookings Institution, and Momentum Research Group last year estimated that the adoption of Internet business solutions had yielded cumulative savings of $155 billion in the U.S. alone. They projected an additional $373 billion in future cost savings, most of it to be realized by 2005.

Yet many organizations lack the network infrastructure to make the most of their existing applications, much less future ones. One reason is that access to these applications frequently does not extend beyond the walls of corporate headquarters, despite the fact that an estimated 42 percent of enterprise employees work out of remote locations.

An intelligent network infrastructure provides everyone with the resources to do their jobs more efficiently and effectively. Applications can be securely extended out from headquarters routers to any location with intelligent, high-performance WAN aggregation routers which connect to access routers across the enterprise, linking branch offices, mobile workers, partners, suppliers, and customers in a seamless network.

Integrated Security

These days, it takes a lot more than a firewall to protect corporate networks.

After all, access is rapidly being extended beyond traditional corporate boundaries to branch offices, mobile workers, partners, suppliers, and customers. And that's a good thing, since it allows companies to do business more quickly and efficiently than ever. But it also opens up new risks, both internally and externally.

Cisco integrated security solutions provide the industry's most comprehensive and scalable safeguards, enabling you to protect productivity gains and reduce network operating costs from the head office to the branch office and beyond.

It starts with the Cisco SAFE Blueprint, which simplifies all aspects of security design and rollout. Whether you're reinforcing the entire network at once or taking incremental steps, SAFE serves as a guide to best practices in enterprise networks, focusing on expected threats and methods of mitigation, rather than specific topologies. It's a flexible, dynamic strategy for implementing multiple layers of defense, so the failure of one system will not be likely to compromise network security overall.

By the same token, the array of security features integrated into Cisco routers gives you the choice of implementing whatever levels of protection measures they need, wherever they need them. Integrated AAA services (Authentication, Authorization, and Accounting), virtual private network services, intrusion detection systems, content filtering, and stateful firewalls are all available to keep data safe as it moves through and between networks—without impacting performance.

In a study released last year, the FBI and the Computer Security Institute surveyed 503 U.S. computer security practitioners in the public and private sectors, and found that 90 percent had detected security breaches within the previous 12 months.

The most commonly reported problems included employee abuses of network resources, system penetration by hackers, and denial-of-service attacks. Any of these issues would be alarming, but together they demonstrate the range of threats companies face today, and show why no single point of defense is enough.

Integrated security is a hallmark of all Cisco products, from the switches and routers that form an intelligent network infrastructure, to Cisco PIX® Firewalls, VPN Concentrators, Intrusion Detection appliances, IP phones, and wireless access points. That level of protection should be reassuring to employees, partners, and customers alike.

The Answer is Cisco—As the worldwide leader in networking for the Internet, Cisco offers the industry's largest and most versatile portfolio of routers to suit every need, from the home office to the branch office to the enterprise campus. Modular designs allow you to expand network services incrementally as new needs and opportunities arise.

Integrated features such as virtual private network services, firewalls, intrusion detection systems, content delivery, survivable remote site telephony, inline power, and low-density switching allow you to confidently deploy the most demanding solutions, including converged data, voice, and video applications.

Cisco routers also offer a unique level of investment protection. Cisco Systems devotes approximately 18 percent of sales to R&D, giving our engineers unmatched resources to build upon established products and technologies. Take Cisco IOS® Software, for example, the operating system that unifies all Cisco routers and switches and provides most of the intelligence in the network. At this very moment, 1,200 people are working to enhance and expand the capabilities that have made it a pillar of networks the world over.

By designing products with the future in mind, Cisco offers the best value over the long term. New features and functionality can be incorporated as needs change and technologies evolve, which lowers the total cost of ownership by saving you the expense of replacing something that won't be supported a year or two down the road.

And at Cisco, support means much more than simply providing hardware and software. As *Fortune* magazine recently observed, "Whenever there is a problem big or small, the folks running the networks in corporations know they can call Cisco."

That peace of mind might not be your only motive for building an intelligent infrastructure with Cisco routers and switches, but it's a surefire sign of an intelligent investment.

Learn how Cisco routers can offer your company a greater return on its investments in technology.

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Cisco Systems

Superior Manageability

While an intelligent infrastructure offers powerful benefits, managing something so sophisticated can sound overwhelming, particularly to a harried IT department. But with the right tools, you can actually simplify most administrative tasks even as you gain greater control over network resources.

Cisco Systems provides those tools, ensuring you can capture all the benefits of an intelligent network infrastructure, without having to be an expert on every feature and capability.

One reason is that Cisco IOS® Software unifies all Cisco switches, routers, and other devices, creating a network that is inherently more manageable and providing a rich source of data to help you optimize network operations.

Drawing on that rich IOS data and unmatched industry expertise, Cisco has built best practices into the CiscoWorks family of Web-based network management tools, helping you to streamline management tasks and secure your network from end to end.

CiscoWorks templates and wizards simplify and automate complex configurations to help you implement security policies, use QoS to prioritize traffic for IP telephony or other time-sensitive applications, and manage a range of other operations. These tools also help prevent human errors—mistakes that can open holes in security or even bring down the network, cutting into your company's profits.

If a problem does occur, you won't be caught off guard. A properly managed intelligent infrastructure continually monitors for faults, and can even spot deteriorating conditions before they get out of hand, providing a safety net for your business.

CiscoWorks management applications give you the visibility to monitor the impact of the network policies and priorities you establish, and the flexibility to fine-tune things as you go along, and add new technology as your needs change and the network grows. As a result, you can get more out of your business applications today, and also do a better job of planning for the future.

If that sounds like good news just for the IT department, consider this: It's been estimated that for every dollar a company spends on new technology, it can spend another four trying to make it work. So it stands to reason that the better you're managing your network, the better you're managing your business.

if she had presented an alternative for HP if the deal was voted down. According to Anders, she never did because "she wanted to project constant certainty that the HP-Compaq merger was the right choice for the company and that she was confident most shareholders would agree in due time." Any inkling she wasn't convinced would have hurt her cause.

The same is true of any leader who tries to engage and motivate people to follow a difficult or unpopular route. It's wiser to show courage and determination to achieve a specific goal than to set out distracting alternatives or a Plan B.

Of course, vision has to be thought out and responsive to market changes, but wavering in front of the very people who look to you for leadership — no matter how touchy-feely the management books tell you to be — doesn't inspire respect. And it certainly won't help your results. ◆

DAVID MOSCHELLA

War Results Are Key to IT's Future

IT'S WINTERTIME, and the only thing growing is the number of IT spending forecasts. Goldman Sachs and Meta Group say our industry is shrinking; IDC, Gartner and Forrester expect modest growth. Of course, no one really knows.

Most of these projections are based on surveys of people like you. And since you don't know how much you will actually spend this year, how can they? At best, spending forecasts reflect the range of current business sentiments. But these sentiments can change quickly, depending on how the year develops. And during 2003, there will be only one factor that ultimately matters: war.

Even today, many free-market proponents are reluctant to acknowledge the fact that it took World War II to finally end the Great Depression and create the long U.S. boom of the 1950s and '60s. Conversely, anyone over 40 surely remembers how America's disastrous experience in Vietnam contributed to the pessimism, anxiety and

many would become the world's new economic leaders. Ronald Reagan became president by explicitly rejecting this message.

Given this history, it has always surprised me how few connections have been drawn between the last Gulf War, which ended in February 1991, and the long U.S. economic boom that began in 1992. America's surprisingly easy victory was particularly important to the IT industry, since it demonstrated to the entire world the power of advanced technology. Looking back, it was the economic decline of Japan, the renewed confidence in modern, mostly U.S. technology, and the emergence of the Internet between 1993 and 1995 that sent the U.S. economy and the IT sector into overdrive.

DAVID MOSCHELLA'S latest book is *Customer Driven IT, How Users are Shaping Technology Industry Growth* (www.customer-driven-it.com). Contact him at dmoschella@earthlink.net.

Today, another war is increasingly likely and will also prove pivotal. Even more than the dot-com bust and sickening corporate scandals, it's the threat of terrorism, the risks of war and the growing anti-Americanism in many corners of the world that are weighing down the IT marketplace. Thus, until we know whether international events are about to get better or worse, we can't possibly know which way our industry is headed. And although the impact of these events upon IT spending is among the least of our concerns, that doesn't mean their effects are any less real.

Clearly, many of us have different views about Iraq and the wider war on terrorism. But there's little doubt that unless major new terrorist attacks are avoided and the Iraq (and possibly North Korean) situation is resolved in a way that satisfies both the U.S. and

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READERS' LETTERS

Contracts Depend on Relationships

MANY OF US have seen a relationship-threatening issue arise as a result of contract interpretation, despite the best intentions on both sides ["ROI or Your Money Back," QuickLink 35982].

ROI is based on input from both parties and on projections about the future. ROI-based payment contracts are complex and can require a labyrinth of terms and conditions to protect both sides from subjective interpretations and changes in the business environment that invalidate the ROI assumptions.

A good guideline is to embed as few variables as possible and tie performance-based payment to verifiable metrics that underlie the ROI. Although tying payment to ROI is desirable, it's far from a panacea. Ultimately, a performance-based contract depends on a quality relationship and the integrity of both sides. If those are present, then the measurement process will validate that relationship, but in many cases it will merely test the relationship – with the consequent legal fees.

George Blanck
Senior architect, x40 Associates Inc., New York, gsblanck@nyc.rr.com

What Silver Lining?

WOW, IT'S GREAT that there's a silver lining to outsourcing. I thought we had to be worried that Americans wouldn't be able to do programming and engineering anymore. Instead I find out from Maryfran Johnson's editorial "Your Outsourced Future" [QuickLink 36001] that former IT workers will all get to be executives and project managers. When do we start? After all, there must be lots of executive jobs available at the great American companies that have shown they are eager to hire Americans.

Linda Evans
Matthews, N.C.

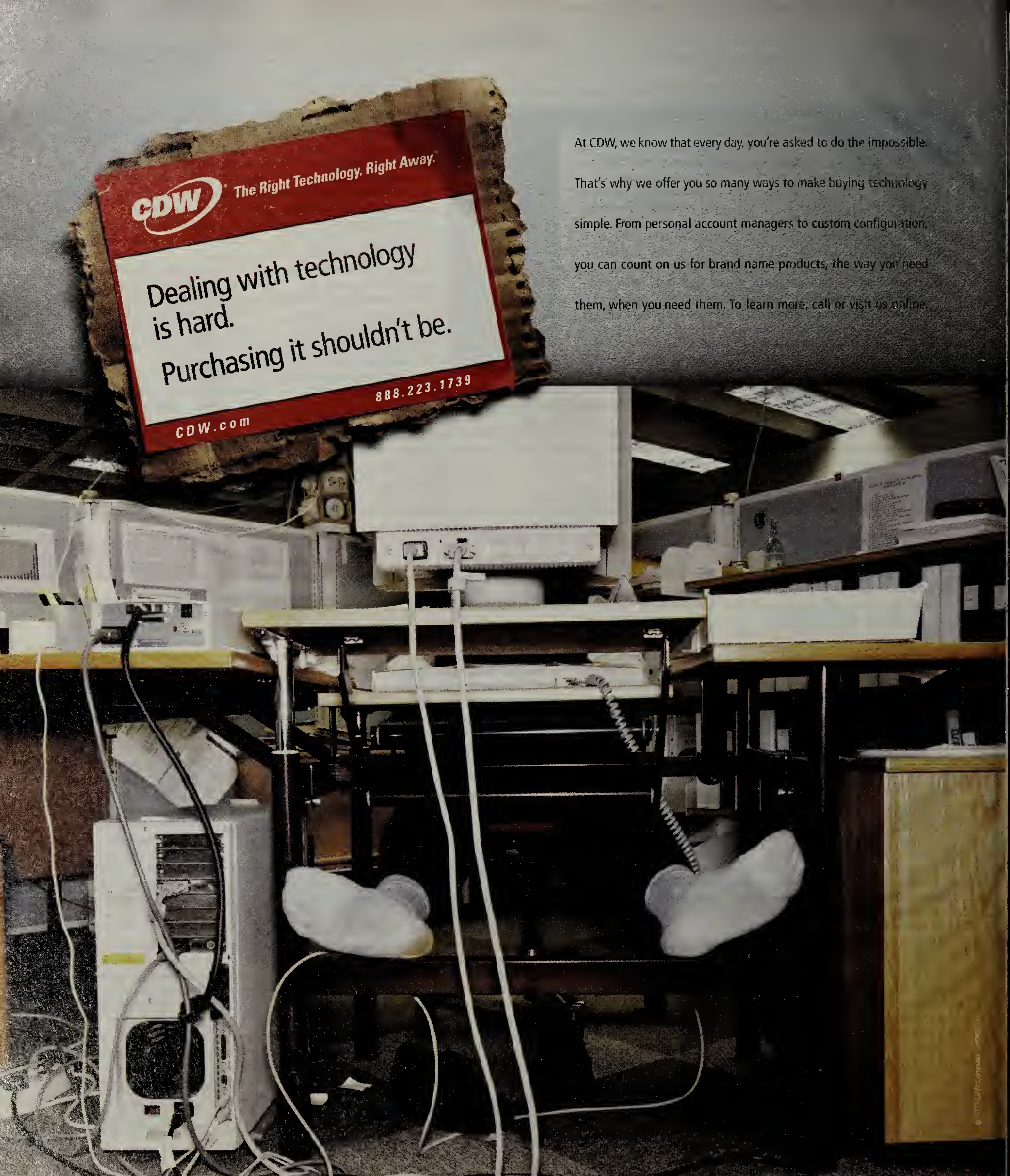
I WOULDN'T ENTRUST a remote third party with trade secrets and client records. Instead, we should outsource the higher-level dealmaking and schmoozing, which are

Abuse of H-1B Visa System Is Rampant

I SUSPECT THERE ARE several reasons why IT and engineering professionals object to the H-1B program, as implemented [QuickLink 36047]. The program was ostensibly designed to meet technical service needs and fill shortages. What actually happens is that H-1B workers with the same skills as many out-of-work U.S. workers are brought in for the purpose of bidding down contracting rates and salaries and making quick profits.

In the U.S., people from the same countries as the H-1B workers abuse their passports and return tickets. Even when they find out what's being done to them, these well-educated, competent and honest professionals often feel powerless and continue to accept these conditions as preferable to deportation.

Maybe it's time for all professional and technical service firms to engage in full disclosure and announce billing rates and consultant/contractor compensation to clients and workers. The more ethical firms already do that, and in so doing earn the respect and loyalty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The Next Chapter

It may be time to dig out your old finance textbooks, says one pundit. Others predict that Wall Street analysts will start monitoring corporate IT investments and that CIOs will find their compensation linked to delivering ROI. **Page 43**

Where ROI Models Fail

ROI models such as net present value are effective in helping CIOs cost-justify IT investments to top brass, but they come up short in measuring "soft" benefits such as the impact on sales, customer service or employee productivity. **Page 38**

EDITOR'S NOTE

I'VE HEARD THE ARGUMENT that failing to do return-on-investment calculations is business malpractice. And I've heard the argument that they're a waste of time. The truth is more complicated, of course.

As a general rule, major IT investments should go through the ROI wringer just like any other business investment — even more so, because IT investments have a tarnished history. One side benefit to ROI scrutiny is that it can kill off pet projects that need to be stopped, like the customer relationship management initiative launched because the marketing vice president is a golf buddy of a guy at Siebel.

Doing the math is especially important for projects that have million-dollar price tags. On the other hand, it may be overkill for projects so small that the ROI exercise would be more expensive than the project itself. Even ROI calculations need an ROI.

And sometimes, an IT project would deliver such a mind-blowing competitive advantage that crunching the numbers seems unnecessary. There's a chance that we're killing off revolutionary IT ideas with today's relentless focus on the 12-month payback.

I'm inclined to agree with John Jordan, a big thinker at Cap Gemini Ernst & Young, who predicts that there will be a middle ground between what he calls the "just do it" and the "by the book" ends of the spectrum. "This middle ground will still require sound business cases," he says, "but they'll incorporate a mix of common sense, professional judgment, quantitative modeling and strategic perspective." ◆

Mitch Betts (mitch_betts@computerworld.com) is director of Computerworld's *Knowledge Centers.*

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MARIA RENDON

Do the Math!

SPECIAL REPORT

A CIO's guide to the strengths and weaknesses of ROI calculations.

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STEVE WOIT

"Anybody can play with the numbers and make an investment look attractive," says **Steve Brown**, CIO at Carlson Companies, which recently put in place a more stringent set of guidelines for IT project approval.

Diligence Rewarded

CIOs who do the ROI math have some tips for making the task easier and more beneficial.

By Johanna Ambrosio

THEIR METHODS MAY VARY, but IT executives who calculate return on investment before launching major technology projects say they reap benefits that make doing the math worthwhile.

The most obvious payoff is getting resources to do the job, but the ROI process also forces IT to explain to corporate management what's going on. This can provide buy-in for a particular project. It also enforces two-way communication between the CIO and other company executives about IT's overall role in the company.

Here's what four IT executives say about the benefits and lessons learned from their ROI calculations.

Factor in Business Goals

Just about all the IT executives interviewed for this article agreed that using a single ROI model isn't enough to justify an expensive technology buy.

"Anybody can play with the numbers and make an investment look attractive," says Steve Brown, CIO at Carlson Companies Inc. The Minneapolis-based travel conglomerate and parent of Radisson Hotels, among other brands, recently enacted a more stringent set of guidelines for IT projects. To get approval, IT projects have to add to top-line revenue growth or profit, reduce costs, create or strengthen the existing brand image or mitigate a risk. The guidelines help the company steer clear of bad investments and maximize the investments it does make.

"Each measurement is something important to a specific business unit or to the company to help us grow," says Brown. "As conditions change, we can measure the effect of the changes in each business unit's quarterly results. So if something changes in the business, we can tie it back to our strategy — it's not a lagging indicator."

Look Beyond Financials

But where Carlson turned to a stricter approach to ROI, Catherine Kozik, CIO at bandwidth services provider Tellabs Inc. in Naperville, Ill., went the other direction. "We do simple math," she explains. "We look at the fully loaded costs for the first two years — implementation costs, people and acquiring skills. But there's a limitation to the accuracy of the data in many ROI models, so what's the point? If you're making up numbers to begin with, it's not really going to help you" decide whether an IT project makes sense.

So instead of a financial-only ROI process, Kozik's group looks at many factors as part of its overall evaluation of any new technology. First is how mature the technology is and whether it represents a continuation of the company's existing skill set or a totally new direction.

Kozik's group also looks at the market position of the vendor — not its financial strength — she says, because in a down market, many technology providers are struggling. Instead, she figures, if the product or service has the lion's share of its market, it will continue to be offered, even if the vendor is ultimately acquired by another.

The last step is viewing the project in the context of the firm's overall strategy. "Not the written strategy or whatever people are paying lip service to, but the things that are really important to the executive team," Kozik says. "I consider it my No. 1 job to keep in touch with what's going on at that level."

After all these factors are gathered and given a numerical weight — costs, skill sets, market position of the vendor and how the project fits with Tellabs' overall strategy — the IT team assigns the pending project an assessment number. The lower the number, the more risky the project and the more iffy its likelihood of success.

All told, the entire ROI process takes only about two weeks at most. "We don't want to overengineer the process, because then people would walk away," Kozik explains.

Save ROI for Big Projects

La-Z-Boy Inc., a furniture maker in Monroe, Mich., takes a different approach. There, ROI analyses are done only for "major" IT projects — those over a certain dollar amount that Gary Clark, director of corporate IT services, declines to specify. He says that perhaps 10% to 20% of all IT projects are put under a sharp financial microscope, but those projects represent a majority of the IT budget.

Tough Task

It's helpful to remember why ROI is done in the first place: to get the dollars needed for IT, certainly, but more important, for IT to help the business achieve its objectives.

The jury has been out for years about IT's role in enabling productivity. A November 2002 report by McKinsey & Co. says IT's impact over the past decade has been "diverse and complex, depending on when, where and how it has been deployed."

Indeed, the report singles out only three sectors where IT has had a quantifiable impact on productivity: semiconductors, retail and financial services.

Just as there is no silver bullet in terms of IT's financial impact, there is no single answer regarding how to measure technology-related ROI and what to include in that assessment. Expectations for IT's ROI can and have changed, based on the economic circumstances and corporate culture.

Erik Brynjolfsson, a management professor at MIT's Sloan School of Management who specializes in IT effectiveness, says that "unfortunately, many worthy projects are not getting funding" right now. "After being burned by vague promises in the past, CFOs have become highly skeptical" of the promises of IT's soft benefits and are insisting on hard, tangible returns for each investment, he notes.

"While a bit of this is healthy," Brynjolfsson says, "my research shows that up to 90% of the costs and benefits of IT investments are in intangibles. Firms that ignore this fact risk sacrificing their long-term growth to make their short-term numbers. Striking the right balance requires a fair assessment of both tangibles and intangibles."

– Johanna Ambrosio

Clark echoed a sentiment heard from other CIOs: Because of the time and resources required to do any type of major financial analysis of new technology, many shops reserve a truly in-depth ROI process for their biggest-ticket or highest-impact strategic initiatives. Adding more PCs or storage to existing systems is hardly worth the effort in most cases; those kinds of expenditures typically come out of the operations budget.

La-Z-Boy looks at any projects that are subject to ROI analysis for how much the initiatives will cost in terms of ongoing maintenance fees, as well as for net present value. The net present value method essentially figures out how much the project's future net cash flow will be worth in today's dollars. That amount is then compared with the amount of money needed to implement the project.

Even for technology projects, calculating ROI isn't necessarily an IT-only endeavor. Business users and/or financial people may gather the data and work on some of the analyses for the largest projects. As Clark says, "It's not our expertise to understand what a CRM package is going to bring to the company; the business unit is the one that knows. So they're doing the ROI on that the data."

DO'S AND DON'TS

DO CREATE an ROI document that explains what you're pitching and why, and what the different options are. Use visual aids to help explain the technology you're proposing.

DO USE ROI within a broader context – with a balanced scorecard, for instance – to know where all your IT projects stand relative to one another.

DO JUSTIFY IT expenditures in terms of how they'll make the company more successful.

DON'T CONDUCT an in-depth ROI analysis for every project; it takes time to do it properly, so save it for your major expenditures or key initiatives.

DON'T FORGET to figure the level of risk for a particular project. If you're proposing several high-risk projects at the same time, you're probably setting yourself up for failure.

DON'T NEGLECT to revamp your ROI process every year or two. Like any other process, it needs to keep up with company, competitive and global economic changes.

Work With the Finance Folks

At General Motors Corp., IT staffers work closely with the financial organization to do ROI analyses, says Tony Scott, chief technology officer at the automotive giant. "The financial organization has a formal ROI calculator — what we're replacing, current costs, future costs, transition costs and other metrics," he says.

Where this model isn't as helpful is when technology is being used to do something completely new. "If we have a new business venture, there's nothing to compare it against" — no historical trends or costs, Scott says. This is where it's crucial to align organizational objectives, he explains. It becomes a lot easier to justify something when you can show that it will grow customer retention by 15%, because that benefit is already well tracked and well understood.

One key ROI metric is time spent or saved, and GM has used technology to help reduce the time it takes to develop a new car from 48 months to 18.

Both complicating and helping matters is GM's organizational chart. Within IT, there are CIOs responsible for overall IT profit and loss (P&L) within a given geographic region. Then there are PIOs, or process information officers, who are responsible for specific horizontal applications across all geographic regions — manufacturing or finance, for instance.

"There's a natural tension between PIOs, who want to drive new applications, and CIOs, who want to optimize P&L for their region," Scott says. "There are interesting discussions about what's the right thing to do at any intersection of that matrix." One result, though, is that "it's hard to pull the wool over anyone's eyes — you have to make a business case in each geographic region" for any major new technology initiative, he says.

As Tellabs' Kozik explains, "If you focus just on the ROI calculation, then you're playing liar's poker. The biggest liar is going to win, and that's ultimately not a successful business practice. So we have to get back to what we're trying to achieve: value to our customers and shareholders. Our justification process makes sure we're working on the right things for the business." ▶

Ambrosio is a freelance writer in Marlboro, Mass. Contact her at jambrosio@earthlink.net.

THE CARLSON WAY

For more on CIO Steve Brown's approach to ROI, including how a possible war with Iraq might factor into his analysis, read the full Q&A.

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Net Present Value

Measure the future in today's terms. By Gary H. Anthes

DEFINITION: The net present value (NPV) of an investment is the present (discounted) value of future cash inflows minus the present value of the investment and any associated future cash outflows.

WHAT IT MEANS: It's the net result of a multiyear investment expressed in today's dollars.

STRENGTHS: By considering the time value of money, it allows consideration of such things as cost of capital, interest rates and investment opportunity costs. It's especially appropriate for long-term projects.

WEAKNESSES: Ranking investments by NPV doesn't compare absolute levels of investment. NPV looks at cash flows, not at profits and losses the way accounting systems do. NPV is highly sensitive to the discount percentage, and that can be tricky to determine.

UNLIKE the more widely used payback period, NPV accounts for the time value of money by expressing future cash flows in terms of their value today. It recognizes that money has a cost (interest), so that you would prefer to have $1.00 today to having $1.00 a year from now. If you earn 10% interest on your money, $1.00 today will be worth $1.10 a year from now. Or, turning that around, the "present" value of $1.10 one year out is $1.00.

You probably wouldn't want to make an investment that's estimated to produce a negative NPV. The bigger the NPV — other things being equal — the more attractive the investment is.

Computing NPV requires use of a discount rate equal to some minimum desired rate of return. This could be your company's average weighted cost of capital (debt and equity) as computed by your finance department. If capital costs your company 10%, you aren't likely to invest that capital for an 8% return. Unfortunately, computing the cost of capital can be difficult and controversial.

The discount rate (say, 10%) determines the discount factor for each year (say, .909) that is applied to that year's cash flow to convert it to today's dollars. The discount factor for year *n* can be computed as: discount factor = $1/(1+i)^n$, where *i* is the target rate of return. So at a discount rate of 10% in Year 1, discount factor = 1/(1.1), or .909. Thus, in the earlier example, the present value of $1.10 a year from now is $1.10 x .909, or $1.00.

NET PRESENT VALUE:
What It Looks Like

		ATM installation		Server consolidation	
Year	Discount factor (at 10%)	Cash flow	Present value of cash flow	Cash flow	Present value of cash flow
0	1.000	-$1 million	-$1 million	-$1 million	-$1 million
1	0.909	+$500,000	+$454,500	+$1 million	+$909,000
2	0.826	+$500,000	+$413,000	+$750,000	+$619,500
3	0.751	+$500,000	+$375,500	+$500,000	+$375,500
4	0.683	+$500,000	+$341,500	-	-
5	0.621	+$500,000	+$310,500	-	-
Total		+$1.5 million	+$895,000	+$1.25 million	+$904,000

■ **NPV considers the time value of money.** In this example, we compare two $1 million projects with a minimum desired rate of return of 10%. On the basis of simple cash flow, the ATM installation looks better because it generates $250,000 more over the life of the investment. But when the time value of money is considered, the server consolidation project looks slightly better, with an NPV higher by $9,000, because the returns occur earlier in the project's life.

Fortunately, this math is automated in spreadsheet packages. You enter only the undiscounted cash flows, the years in which the flows are expected and some target interest rate. NPV will pop out.

The chart below compares two projects that a bank could undertake. Each has an initial investment of $1 million and a minimum desired rate of return of 10%. On the basis of absolute (undiscounted) return, the ATM installation is better because it generates $250,000 more cash over the life of the investment. But when the time value of money is considered, the server consolidation project looks slightly better, with an NPV higher by $9,000. Its present value is higher because the returns occur earlier in the project's life.

Gaylord Entertainment Co., a Nashville-based hotel and resort company, relies on relatively simple measures such as payback period to evaluate investments of less than $100,000. Between $100,000 and $500,000, it also looks at discounted cash flow (DCF). "And above $500,000, DCF is absolutely necessary," says CIO Kent Fourman.

The yearly cash flows from a hotel or entertainment project are net revenues, but for an IT project, they generally are cost savings, Fourman says. But he says NPV isn't appropriate for an IT project that can't be associated with clearly defined cash flows.

"We are doing Windows 95 to Windows 2000 and XP conversions, for example, and you're not going to come up with a traditional DCF on that kind of project," Fourman says. "There are benefits that are not necessarily financial in nature."

NPV has some flaws, says Ian Campbell, chief research officer at Nucleus Research Inc. in Wellesley, Mass. He offers an example in which two investments each have an NPV of $100, but one involves an initial investment of $1,000 and the other an investment of $1 million. Clearly the $1,000 investment is preferable because it's less risky and ties up less capital, he says.

But, Campbell adds, NPV is a good "no-go indicator," because you'd normally reject an investment with a negative NPV without further consideration. Those with a positive NPV should then be measured by other yardsticks, he says. ▶

NPV FOR DUMMIES

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Internal Rate of Return

Sort projects into 'go' and 'no-go' piles. By Gary H. Anthes

DEFINITION: The internal rate of return (IRR) is the discount rate that results in a net present value of zero for a series of future cash flows.

WHAT IT MEANS: It's a cutoff rate of return; avoid an investment or project if its IRR is less than your cost of capital or minimum desired rate of return.

STRENGTHS: It provides a simple hurdle rate for investment decision-making. It's the method favored by many accountants and finance people, possibly the ones at your company.

WEAKNESSES: It's not as easy to understand as some measures and not as easy to compute (even Excel uses approximations). Computational anomalies can produce misleading results, particularly with regard to reinvestments.

IRR is the flip side of net present value (NPV) and is based on the same principles and the same math. NPV shows the value of a stream of future cash flows discounted back to the present by some percentage that represents the minimum desired rate of return, often your company's cost of capital.

IRR, on the other hand, computes a break-even rate of return. It shows the discount rate below which an investment results in a positive NPV (and should be made) and above which an investment results in a negative NPV (and should be avoided). It's the break-even discount rate, the rate at which the value of cash outflows equals the value of cash inflows.

Consider the three scenarios shown here (see table), each involving an initial investment of $1 million. The investment returns $300,000 (undiscounted) per year in each of the five years after the initial investment, for a net return of $500,000.

ROI GUIDE

A company evaluating this investment using cash flow discounted at 10% would compute an NPV of $137,000, a decent but not spectacular result. But if the company evaluates the same investment at 15%, the project has a present value of only $6,000, essentially just breaking even, and at 20% the project's present value is negative. The IRR is a fraction of a percentage point above 15%; at that discount percentage, the investment's NPV is zero.

IRR is often used as a hurdle rate, a sort of go/no-go investment threshold. Gaylord Entertainment Co. in Nashville, for example, has computed its weighted average cost of capital — a percentage that it won't disclose — and a "hurdle" percentage rate a few points higher. An investment's IRR must generally equal or exceed the hurdle rate to be approved by management, says CIO Kènt Fourman.

"We calculate the IRR and then compare that to our hurdle rate," Fourman says. "And we compare that IRR against every other [project's] IRR, because you always have limited cash."

But the IRR cutoff isn't an absolute test, he says. For example, management's subjective assessment of risk may influence an investment decision, he says. "But if you can't show that IRR exceeds our hurdle rate, then you'll have to have a lot of the soft justifications to get it approved," Fourman says.

Not everyone is as enthusiastic about IRR. Like NPV, it doesn't measure the absolute size of the investment or its return. And because of the way the math works, the timing of periods of negative cash flow can affect the value of IRR without accurately reflecting the underlying performance of the investment.

IRR can also produce misleading results because, as classically defined, it assumes that the cash returned from an investment is reinvested at the same percentage rate, which may not be realistic. That error is magnified when comparing two investments of different durations. Some software, such as Microsoft Excel, will compute an optional "modified IRR" that allows the user to specify a different reinvestment rate.

IRR becomes increasingly misleading the more it diverges from the cost of capital, says Ian Campbell, chief research officer at Nucleus Research Inc. in Wellesley, Mass. "IRR is a terrible metric, and it should never be used," he asserts.

The key metric for IT projects, Campbell says, is payback period, because it favors short-term, and hence less risky, projects that IT should be doing. ◗

INTERNAL RATE OF RETURN:

What It Looks Like

		Discount rate: 10%		Discount rate: 15%		Discount rate: 20%	
Year	Cash flow	Factor	Amount	Factor	Amount	Factor	Amount
0	-$1 million	1.000	-$1 million	1.000	-$1 million	1.000	-$1 million
1	+$300,000	0.909	$273,000	0.870	$261,000	0.833	$250,000
2	+$300,000	0.826	$248,000	0.756	$227,000	0.694	$208,000
3	+$300,000	0.751	$225,000	0.658	$197,000	0.579	$174,000
4	+$300,000	0.683	$205,000	0.572	$172,000	0.482	$145,000
5	+$300,000	0.621	$186,000	0.497	$149,000	0.402	$121,000
Total	+$500,000	NPV = +$137,000		NPV = +$6,000		NPV = -$102,000	
		IRR = slightly more than 15%					

■ IRR is often used as a hurdle rate, a sort of go/no-go investment threshold. In this example, there is an initial investment of $1 million, with a net (undiscounted) return of $500,000. The NPV of the $1 million outlay depends on the discount rate, or cost of capital, used to evaluate the investment. The NPV is zero at the IRR, here a fraction of a percentage point above 15%.

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Balanced Scorecard

It's a forward-looking 'dashboard' for executives. By Gary H. Anthes

DEFINITION: A set of principles and analytic techniques for improving an organization's performance in four general areas: financials, customers, learning and internal processes.

WHAT IT MEANS: Long-term organizational excellence can be achieved only by taking a broad and holistic approach, not by focusing solely on financials.

STRENGTHS: This approach is potentially all-encompassing, combining financial and nonfinancial goals and measures. It can encompass the performance of entire companies or business units, not just individual investments or projects. Balanced scorecard is future-oriented, not a rearview mirror on performance.

WEAKNESSES: This method is potentially so broad that it may divert resources from those few areas that really are vital to shareholder return. It doesn't readily weight the relative importance of the different metrics it uses.

CREDIT FOR the balanced scorecard idea most often goes to Robert S. Kaplan and David Norton, who wrote an article about it for the *Harvard Business Review* in 1992. Certainly, many of the underlying ideas go back much further, and today, many companies use one or more of its principles without having adopted the balanced scorecard methodology in any formal sense.

"There are many different balanced scorecards, and they serve many different purposes," says Arthur Schneiderman, an independent business-process management consultant in Boxford, Mass. "But most organizations will say its purpose is to link strategy to action."

Regardless of how one defines it, the balanced scorecard is based on several underlying notions. The first is that financial measures alone aren't sufficient to size up the health of a company and that a single-minded pursuit of financial objectives could lead your company to ruin in the long run.

The second is that balanced scorecard focuses on process, not metrics. As such, it's forward-looking (How can I retain my best customers?) rather than backward-looking (What were my earnings per share last quarter?).

The scorecard is an analytic framework for translating a company's visions and high-level business strategies into specific, quantifiable goals and for monitoring performance against those goals. The methodology breaks high-level strategies into objectives, measurements, targets and initiatives.

For example, Southwest Airlines Co. employs a number of scorecards, one of which relates ground-crew performance to company profitability (see chart). It arranges the four quadrants of the balanced scorecard — learning, internal, customer and financial — in a hierarchy that shows how objectives relate to one another.

Directly relating a financial measure such as "lower costs" with an operations metric like "fast ground turnaround" is a relatively new idea at the Dallas-based airline, says Mike Van de Ven, vice president of financial planning and analysis. "Historically, the budget system was the primary system to monitor costs, and if you were an accountant, you got it," he says. "But if you were an operations person, and you weren't used to cost centers and general ledgers and budget-to-actual variances, it didn't make any sense to you."

The operations people had hundreds of metrics dealing with things such as on-time performance or baggage delivery, but they weren't linked directly to the financial measures or the budget system, Van de Ven says. "So what we have been doing over the past several years is putting these things together, and that neatly rolls into this balanced scorecard concept," he says.

Another advantage of this integrated scorecard approach is that it retains the hundreds of detailed metrics for frontline supervisors but gives top management a "dashboard" displaying a few key measures. "We are trying to get more focused on key measurements that we want to stay on top of," Van de Ven says.

Although nearly everyone applauds the broad view that the balanced scorecard encourages and its proactive, forward-looking thrust, some critics say the scorecard is often misused. "Most of the time, the balanced scorecard will help you identify the wrong things to measure," Schneiderman says. That can waste a lot of corporate resources, he adds.

There's a danger that use of the balanced scorecard can divert management attention away from the most important goals, which are financial, says Ray Trotta, co-founder of iValue LLC, an IT valuation consultancy in Barrington, Ill. "We like the way the Street does things; they talk about dollars and cents," he says. "The balanced scorecard talks about customer relationships, internal processes, learning and growth. I mean, those things are good, but where's the money?" ◗

TO DIG DEEPER

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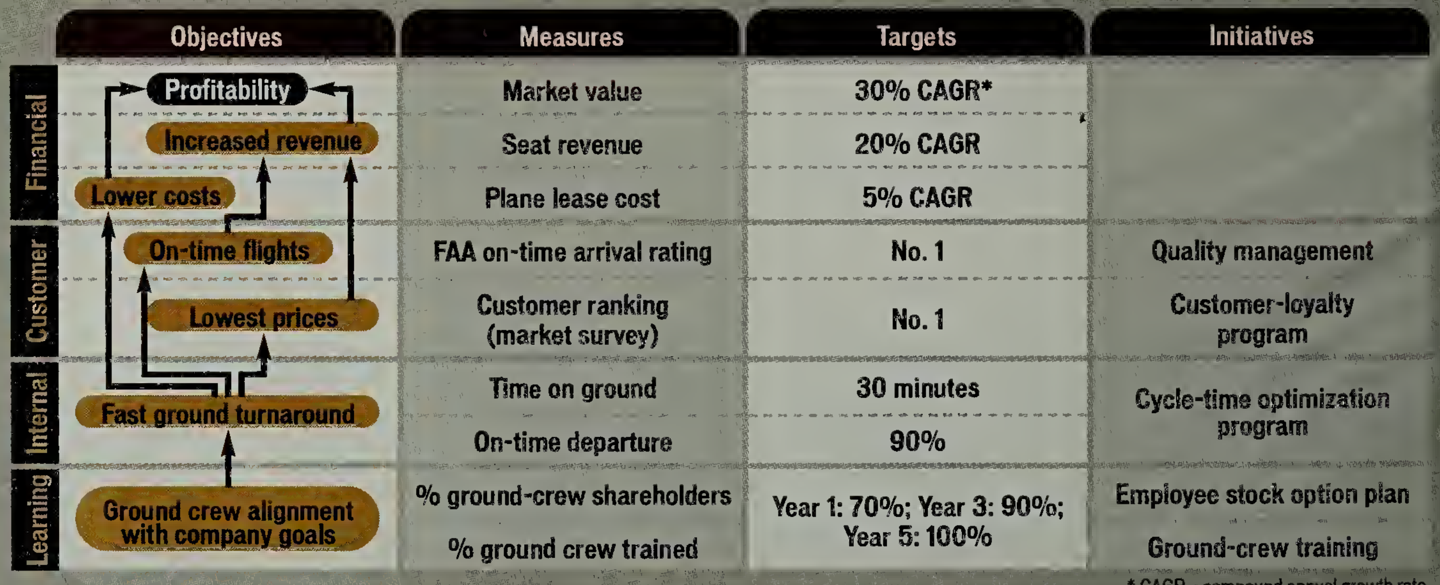
SOUTHWEST AIRLINES' BALANCED SCORECARD:

What It Looks Like



	Objectives	Measures	Targets	Initiatives
Financial	Profitability	Market value	30% CAGR*	
	Increased revenue	Seat revenue	20% CAGR	
	Lower costs	Plane lease cost	5% CAGR	
Customer	On-time flights	FAA on-time arrival rating	No. 1	Quality management
	Lowest prices	Customer ranking (market survey)	No. 1	Customer-loyalty program
Internal	Fast ground turnaround	Time on ground	30 minutes	Cycle-time optimization program
		On-time departure	90%	
Learning	Ground crew alignment with company goals	% ground-crew shareholders	Year 1: 70%; Year 3: 90%; Year 5: 100%	Employee stock option plan
		% ground crew trained		Ground-crew training

* CAGR = compound annual growth rate

■ A balanced scorecard takes a broad, holistic look at organizational goals – not just the financials. For example, this Southwest Airlines scorecard shows that well-trained ground crews mean faster turnaround and more on-time flights, which lead to higher customer satisfaction, lower costs and greater profits.

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Enterprise Storage Security:

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Enterprise Storage Security:

Context, Challenges & Solutions

The rapid growth of networked storage finds IT professionals calling for industry standards and best practices. Users must share the responsibility for setting the storage security agenda. Groups such as the Storage Networking Industry Association (SNIA) Storage Security Industry Forum offer an opportunity to do just that.

Over the past several years, a large number of enterprises have built networked storage environments. These storage networks, using technologies such as NAS and SAN, have allowed firms to create scalable, flexible storage infrastructures; improve productivity while reducing management costs; and promote the efficient use of enterprise information sources. Storage networks also help businesses develop cost-effective backup, data mirroring and disaster recovery procedures.

Yet the key assumption behind storage networks—that enterprise data is most valuable when it can be shared, distributed and replicated as easily and efficiently as possible—is also a source of significant risk. As networked storage systems evolve beyond the data center and expand throughout the enterprise, mission-critical data becomes more vulnerable to unauthorized access, alteration, theft and misuse. As storage capacity continues to increase (many enterprises double their capacity every six to eight months), so does the amount of data at risk—and the potential damage such a breach could inflict.

The trend toward networked enterprise storage environments is inexorable; the economic and operational benefits of the technology associated with networked storage are simply too significant to ignore. However, far too few IT professionals have a clear understanding of storage security issues or a firm grasp on the solutions available to them.

In order to help enterprise storage users evaluate their storage security risks, associated security requirements and solutions, this paper will examine the following questions:

- Are enterprise users aware of storage security issues?
- How should we define storage security?
- What types of storage security solutions are necessary?
- What is the best way to achieve these solutions?

Ultimately, storage security isn't simply a matter of finding and implementing the right technology solutions. Businesses must also demonstrate to vendors and solutions providers that they consider storage security an important IT issue, and that they deem storage security a high priority for the industry.

Perception vs. Reality

Security is obviously a vital concern for any enterprise IT professional. And many IT managers understand that storage networks present unique security challenges, due to the mission-critical nature of enterprise data systems and the potential consequences of a storage security failure.

A recent study conducted by the SNIA Storage Security Industry Forum (SSIF) concluded that enterprise IT managers do indeed consider storage security an important issue, and that most managers have made an effort to improve their companies' security postures.

On a more granular level, however, the study also found a great deal of uncertainty and unease. An overwhelming number of end users don't know if their efforts have succeeded. Those users are frustrated at the lack of best practices, industry standards and even a basic common language for discussing storage security issues with vendors. Moreover, most users rely on default security features within individual vendors' storage products, rather than adopting a proactive, comprehensive approach.

This uncertainty has a direct (and negative) impact on how IT professionals deal with storage security issues. Based on research conducted by the SNIA SSIF, as well as discussions with leading industry analysts and consultants, IT managers commonly face four storage security misconceptions:

- **It's someone else's problem.** In many enterprises, network administrators, storage managers and system administrators lack the authority, resources and expertise to take responsibility for storage security issues. "The problem is that few IT professionals understand both security and storage," says Jamie Gruener, a senior analyst with the Yankee Group. "People have expertise in one discipline or another, but there's not much crossover." As a result, storage security issues often fall through the cracks.
- **It can't happen here.** IT managers may assume that storage networks are less vulnerable to security failures due to the relatively insular nature of these networks. However, most storage-area networks emphasize high availability and powerful management tools, rather than robust security; this can expose a storage network to significant vulnerabilities, such as potentially damaging insider attacks. In addition, businesses may associate SAN security procedures with the perimeter defense measures commonly used in corporate LANs, making them even more vulnerable to internal compromise.
- **It's already been fixed.** Many IT professionals rely on default security features in storage products as their first—and sometimes only—line of defense. At the same time, many vendors configure their products under the assumption that users will implement network-level storage security solutions. This cycle, in which each party expects the other to take primary responsibility for security, can lead to serious problems.
- **It can't be helped.** The uncertainty many IT professionals feel over storage security practices may leave them unable even to assess the effectiveness of their security solutions. "There's an enormous problem caused by the lack of widely understood best practices. In fact, it's not clear that there even are best practices," says Mike Karp, senior analyst with Enterprise Management Associates. This uncertainty can make it more difficult for IT managers to sign off on additional security investments, since they lack the context and standards to weigh the impact of those investments.

Defining the Problem

To avoid these misconceptions, it's essential to understand where, when and how to recognize storage security risks. Within an enterprise IT infrastructure, those risks involve four key areas:

- **Servers, hosts and applications.** Even in SAN environments, hosts and application servers are usually linked to the corporate LAN, allowing access to the storage network through these points.
- **Storage connectivity.** The hubs,

switches and directors that link servers and storage systems are also sources of significant vulnerability. Physical transport, for example, is susceptible to wiretapping; traffic interception and redirection; and other forms of attack.

- **Storage subsystems and media.** Security threats to storage devices, subsystems and media (the physical core of a storage network) can be an even greater threat than access to data in transit, since destroying or damaging these systems may have a devastating impact.
- **Management access.** Given the power and flexibility of storage networking management tools, inadequate security on a single management console can compromise even the most comprehensive security solution.

These areas of vulnerability suggest that the greatest threat to storage security comes from within the corporate firewall, and perhaps even from within an IT organization—a suggestion supported by research and expert opinion. According to various industry studies, between 50% and 70% of security breaches are attacks by disgruntled employees, contractors or IT staffers. "Insiders far outweigh outsiders in terms of security threats," says Tom Petrocelli, president of Technology Alignment Partners. "It's easy enough to mess up a SAN without even trying—imagine what could happen as a result of a truly malicious attack."

In addition to weighing the likelihood of internal and external threats, firms must consider the security implications of simple errors. If an employee destroys data through a configuration error or other innocent mistake, the loss to the enterprise is just as real as if an intruder had deliberately attacked the system. To make matters worse, senior managers may never learn about these "indirect" security failures due to fear of retaliation, leaving them unaware of the true scope of the problem.

Finally, the compartmentalized nature of many IT organizations reinforces the tendency to associate data integrity with the application, rather than with the storage infrastructure as a cohesive system. Administrators may, for example, treat authentication and authorization procedures as application-level data security tools rather than as internal, system-wide storage security components.

To avoid misconceptions, it's essential to understand where, when and how to recognize storage security risks.

Building Effective Solutions

The scope and scale of these challenges demand more than technical solutions; enterprises must rethink their storage security priorities and practices from the ground up. From an operational perspective, IT managers should consider two fundamental changes in their thinking about storage security:

- **Raising awareness.** Decision-makers must recognize storage security as a distinct and important IT priority. "Managers know security is a huge problem at the corporate level, but they don't always recognize how insecure their storage networks really are," Yankee Group's Gruener says. "In fact, the data on their storage network is a lot more valuable, and requires a higher level of security than most of the data moving across their IP LAN today."
- **Assigning responsibility.** Senior IT managers must also assign the resources and responsibility required to deal with storage security issues—including the ability to evaluate, purchase and implement security solutions. "A lot of IT executives don't see this as something they should invest in," Enterprise Management Associates' Karp says. "They have to see storage security as a strategic issue, and they have to get involved rather than handing it off in piecemeal fashion."

IT managers should also recognize that point solutions—the "silver bullets" of storage security—are at best partial remedies and at worst a waste of resources. In addition, managers must understand that traditional network security measures, including virtual private networks; software- and application-level encryption; and LUN (logical unit number) masking and zoning, are an inefficient and incomplete way to manage security risks. To be sure, these measures—when implemented in a comprehen-

The industry needs to focus on defining and publicizing a set of universally accepted storage security best practices.

sive fashion—can provide additional layers of security, but a truly effective solution will encompass two key classes of security technology: storage encryption and authentication, authorization and access control.

Storage security encryption appliances provide several benefits. They operate at wire speed, and they provide end-to-end data security over a storage network no matter where the data is sent or received from. Encryption appliances also provide integrated key management; help enterprises comply with government data privacy directives; extend a consistent security standard across both in-transit and at-rest data; and allow IT managers to outsource storage management functions (such as key management) to their clients.

Storage encryption offers another important advantage as well; it can actually improve efficiency and cut management costs for enterprise storage networks. By assigning different keys to different classes of data—for example, human resources vs. customer service information—an enterprise can segregate data classes without providing separate, fully redundant physical storage resources. This represents an unusual and welcome departure: a security solution that generates a direct and measurable (if still secondary) return on investment.

The next class of security technology—authentication, authorization and access control—is just as vital. Storage network zoning provides a measure of access control. However, enterprises may want to consider "intelligent" storage switches that provide integrated authorization, authentication and accounting features. These solutions provide access control by specifying which devices can attach to which ports; reduce the risk of accidental configuration errors; support transport-independent authorization techniques; and enable more efficient management and accounting procedures.

Typically, such solutions include robust policy-based authorization features that give IT managers a great deal of control over who can access particular segments of a storage network or execute particular storage management responsibilities. As a result, when combined with robust encryption appliances, they create powerful and scalable solutions.

Technology Isn't Enough

A growing number of vendors are entering the storage security market with encryption appliances, intelligent switches, management software, firewalls and other components required to build a comprehensive storage security solution. Unfortunately, as long as deeper problems remain, the storage networking industry cannot meet customers' security needs simply by introducing new products. Among the lingering problems are a dearth of industry standards, widely accepted best practices and a common language for defining and discussing storage security issues.

According to Michael J. Alvarado, chair of the SNIA SSIF, storage security standards must rise to meet two major challenges. "The storage networks of the future will be even more highly distributed than they are today, with far more points of access and more non-technical users accessing them," Alvarado says. "As storage infrastructures move away from being tightly controlled and include more points of vulnerability, the industry needs a set of consistent, vendor-neutral standards for managing these vulnerabilities."

Alvarado adds that storage security standards must move away from an emphasis on perimeter security—a reflection of established IP-based network security models—and toward a layered approach. "There are currently no standards that allow us to extend a single authentication model through the lower layers of a storage network, or to unify different layers

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for security management and coordination," he says. "We need that level of coordination, and the standards-setting process needs to focus on those types of issues."

The industry also needs to focus on defining and publicizing a set of best practices; many experts call this the most urgent problem facing business users today. "Many enterprises still don't understand exactly how to manage storage networks; there's no frame of reference, and what is available is often focused on the corporate LAN, not storage networks," Yankee Group's Gruener says.

The lack of best practices also has a negative impact on vendors, many of which still have a relatively low profile in the industry. "Storage security companies don't have much visibility, and that won't change if people have problems, because they won't think of them as being storage problems," Enterprise Management Associates' Karp says. "The lack of a systems-level approach to the problem is frustrating; these point solutions can't possibly work, but there's no understanding or attempt to fix the complete environment."

Conclusion: Making Change Happen

Enterprise users are more than just technology consumers in this process; they are vital catalysts for change and growth in the storage networking industry. Although storage vendors are eager to tap into new markets, they can be equally reluctant to disrupt existing market opportunities. As a result, much of the responsibility for promoting industry standards and best practices (and for creating demand for the technologies that will incorporate these standards) inevitably falls on companies that use storage networking products.

In order to accomplish this, users must make it clear to vendors that storage security is an important priority that will affect both their storage networking strategies and their investment decisions. This involves asking vendors to deliver product roadmaps, detailed explanations of their storage security technologies and other specific evidence that they are committed to embracing security requirements.

Collective action is an equally important part of the process. Industry groups such as the Storage Security Industry Forum within the SNIA give users an opportunity to set the storage security agenda, promote industry standards and give vendors a clear picture of their customers' needs.

Moreover, participation at this level is more than simply a community-building exercise; it has a direct and immediate impact on the products, technologies and standards on which companies build their IT infrastructures. "As more companies engage with us and give us a clear view of their requirements, we're able to address the vendor community with a single voice and to make it clear that storage security is a vital issue," Alvarado says.

In fact, for many enterprises, storage security is rapidly turning into a high-stakes game with no clear rules. Storage networks aren't just the latest technology fashion; they are quickly becoming as pervasive, powerful and essential as the corporate LAN. Yet it's also clear that businesses must rethink their storage security assumptions and requirements in order to apply this technology safely and effectively. Ultimately, IT professionals face a clear choice: manage their firms' storage security risk today, or manage the consequences tomorrow.✻

About the SNIA

The Storage Networking Industry Association, or SNIA, was incorporated in December 1997 and is a registered 501-C6 non-profit trade association. Its members are dedicated to "ensuring that storage networks become complete and trusted solutions across the IT community." The SNIA works toward this goal by forming and sponsoring technical work groups, by producing (with its strategic partner Computerworld) the Storage Networking World Conference series, by building and maintaining a vendor-neutral Technology Center in Colorado Springs, and by promoting activities that expand the breadth and quality of the storage networking market.

For more information on SNIA and the SSIF, go to www.snia.org. For information on the Customer Advisory Council, contact the CAC chairman at ssf-cac@snia.org.

Q&A: Mike Alvarado, SSIF Chair

Michael J. Alvarado is chair of the newly formed Storage Security Industry Forum and is senior product manager at NeoScale Systems Inc. Alvarado has been involved in the storage networking industry for over 15 years; he has been instrumental in developing customer and industry acceptance for next-generation SCSI-interface products, the Direct Access File System, a new file protocol, and the Open Storage Networking Initiative. We asked him to discuss the SSIF's mission.

Q: What is the SNIA Storage Security Industry Forum, and what does it do?

Alvarado: SNIA created the SSIF to understand and document end-user requirements of storage security practices. To accelerate the development of storage security solutions, SSIF is communicating this feedback to industry technical groups for incorporation into upcoming standards, initiatives and best practices.

Q: Why are standards important?

Alvarado: Standards let users build consistent policies and practices for their entire enterprise. Without a common set of standards, end users in the enterprise must implement a multitude of product-based standards, which will defeat their ability to have a consistent security policy that's executed consistently. Without consistent implementation of policy, security will never be optimal or effective.

Q: What concerns do users have about storage network security?

Alvarado: The top concern is configuration. Many users fear that something like an incorrect configuration on a switch or a storage node will result in data loss.

Storage management applications are another major concern, due to the openness of the environment in which they're deployed. Unlike any other part of the storage architecture, management applications can subvert or undermine security controls installed at the device, record or block layer. Thus, they have significant control in a storage environment.

Q: What are some of the myths about security and IP storage or open storage networking?

Alvarado: The key assumption behind storage networks—that enterprise data is most valuable when shared, distributed and easily and efficiently replicated—also represents a source of significant risk. As networked storage systems evolve beyond the data center and expand throughout the enterprise, mission-critical data becomes more vulnerable to unauthorized access, alteration, theft and misuse.

IT managers may assume that Fibre Channel SANs are less vulnerable to security failures due to the relatively insular nature of these networks. Yet the fact that most SANs emphasize high availability and powerful management tools, rather than robust security solutions, can expose a Fibre Channel SAN to significant vulnerabilities, such as insider attacks.

Q: What role do end users play in the SSIF's communication with vendors?

Alvarado: SSIF has created a Customer Advisory Board that provides direct feedback about what's critical for the industry to focus on. By providing this input, end users assure themselves that development plans and priorities are set in the right direction.

Q: Do customers have a wide variety of secure storage networking options to choose from in today's environment?

Alvarado: End users must drive the storage security agenda. They must begin to demand storage security roadmaps of standards, initiatives and vendor solutions. There are many solutions available; the real challenge is to make sure these solutions follow industry standards.

Q: Where can people get more information about storage security?

Alvarado: The SSIF is unveiling a new Web site that will be a single portal at which users can gain a broad perspective on available issues and solutions. White papers, links to key information sources, news about standards and technology alternatives are all easily accessible. For more information about this site, people can contact ssifchair@snia.org.

SSIF Members on the Forum's Importance

"Proper attention to the security issues of storage networking is long overdue. The SSIF is the only organization that fosters better both industry cooperation and higher user awareness. The SSIF also lets customers help set the agenda. The success of the SSIF will help everyone who sells or uses storage networking, and we're proud to be a contributor to that effort."

— LeRoy Budnik, managing partner and founder, Knowledge Transfer

"SNIA and SSIF bring together leaders in the software and hardware industries to increase the attention and understanding about a complex industry. Interphase looks forward to sharing our storage networking expertise in both hardware and software, as it applies to the emergence of security protocols. We're committed to delivering standards-based storage networking security solutions that interoperate with those from other SNIA vendors."

—Randall McComas, vice-president of global sales and marketing, Interphase Corp.

"SSIF represents an important effort in building a comprehensive SAN framework to address customers' security concerns. As a major contributor to security standards and chair of the T-11 Security Workgroup, Brocade is helping create security protocols for authentication, access control, and confidentiality through the adoption of standards. Brocade is proud to work with other SNIA members to build secure storage networks and promote standards-based solutions that are highly scalable and fully manageable."

— Jay Kidd, vice-president of product marketing, Brocade

"Now that networked storage is moving toward including support for IP transport, data is more susceptible to integrity and privacy attacks. As the leader in network security, Hifn is well placed to contribute to the security of storage networks. As an active member of SNIA, Hifn will bring our expertise to the security best practices database."

— Doug Makishima, vice-president of marketing, Hifn

"Enterprises are expanding their storage infrastructure to achieve greater availability and integrity. While reducing operational risks, this may increase the exposure of unauthorized access to sensitive data. NeoScale views the SSIF as a great vehicle for increasing the awareness of and potential solutions for addressing stored data confidentiality. Industry standards and best practices are essential in order to cost-effectively yield distributed data protection."

— Aseem Vaid, CEO and co-founder, NeoScale Systems

"With SANs becoming mainstream, concern for protecting the data on them has increased. QLogic develops standards-based Fibre Channel and iSCSI SAN products that address customers' security concerns. The SSIF provides an important forum not only for driving these standards, but for determining SAN security best practices."

— Frank Berry, vice-president of marketing, QLogic Corp.

"The increasing vulnerability of data networks and the deployment of virtual storage networks across multiple sites using public and private IP networks are driving the need for IP security solutions at every access point. Adaptec is excited about supporting the SSIF's mission to identify best practices for building secure storage networks and promoting standards-based solutions."

— Glen Clowney, director of marketing for IP storage, Adaptec

"As storage networks expand and customers leverage their information infrastructure across different applications, security becomes a top priority. As a major contributor to the Fibre Channel Security Protocol standard, McDATA is working with its SSIF partners to develop security solutions that make sense. The SANtegrity Security Suite, McDATA's security solution, provides flexible, easy-to-manage, standards-based and comprehensive techniques that give customers peace of mind."

— Mike Gustafson, senior vice-president of worldwide marketing, McDATA Corp.

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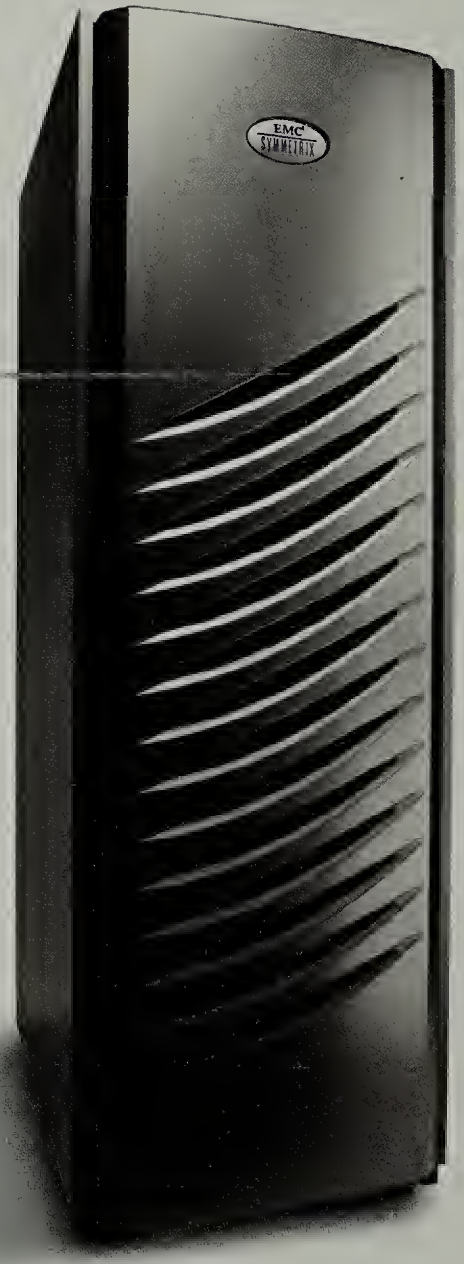

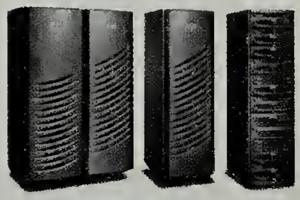

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Economic Value Added

The cost of capital isn't free.

By John Berry

DEFINITION: Economic Value Added (EVA) – a name trademarked by Stern Stewart & Co. – subtracts the capital charge (the capital investment times the cost of capital) from the net financial benefits of the investment.

WHAT IT MEANS: Economic profit is wealth created above the capital cost of the investment. EVA prevents managers from thinking that the cost of capital is free.

STRENGTHS: EVA focuses managers on the question, "For any given investment, will the company generate returns above the cost of capital?" Companies that embrace EVA have bonus compensation schemes that reward or punish managers for adding value to or subtracting value from the company.

WEAKNESSES: As with any metric, it's hard to link precise EVA returns to a specific technology investment. EVA is ideally suited to publicly traded companies, not private companies, because it deals with the cost of equity for shareholders, as opposed to debt capital.

IF A COMPANY INVESTS in manufacturing equipment or a warehouse, how much additional profit will be required to pay for it? Managers are intuitively aware of the importance of value creation to their businesses. EVA is a management philosophy and performance metric that elevates those goals from intuition to rigorous analysis and ensures that no investment escapes scrutiny.

ROI GUIDE

Yes, that includes IT. The fundamental proposition of EVA is that capital isn't free and its cost must be factored into every benefit analysis or return-on-investment model when an investment in a plant, equipment or a new customer relationship management system is contem-

not — shareholders could have invested elsewhere.

Since IT represents a big percentage of a company's annual capital budget, whether a company factors in the cost of capital when deciding on some technology investment is hardly academic. The pure EVA calculation for the company as a whole is:

Net operating profit after taxes
- capital charge (capital investment x cost of capital)

But, purely speaking, there is no net operating profit after taxes (NOPAT) arising out of an IT investment, so the net financial benefits of the IT investment are used as a replacement for NOPAT.

Consider, for instance, a case where the cost-benefit analysis reveals that a

company is 12%. Using the formula above, the EVA in this case is $2,000:
$8,000 net benefits - ($50,000 capital investment x 12% cost of capital) = $2,000 EVA

Another way to calculate EVA in this example is to simply deduct the 12% cost of capital from the 16% ROI, then multiply by the investment:
4% x $50,000 = $2,000 EVA
EVA is always expressed as a dollar amount.

"EVA doesn't make it easy to quantify IT benefits but creates clarity so that all the pluses and minuses of these IT decisions can be considered in ways that companies [that don't use EVA] find difficult to do," says Bennett Stewart, co-founder of Stern Stewart & Co., a New York-based consultancy that coined the term *Economic Value Added*, but not the concept.

Consider a recent EVA analysis that Robert Egan, vice president of IT at Boise Cascade Corp., and his colleagues conducted for a storage investment. The decision was whether to keep storage assets or replace them with new technology that has lower maintenance charges. (The example is illustrative. Egan declined to provide real cost figures.)

The new storage technology costs $1 million, with maintenance costs of $100,000 per year. The maintenance expense on the old storage technology is $350,000. (For simplicity, we'll assume that the new storage equipment offers no benefits other than the lower maintenance costs.)

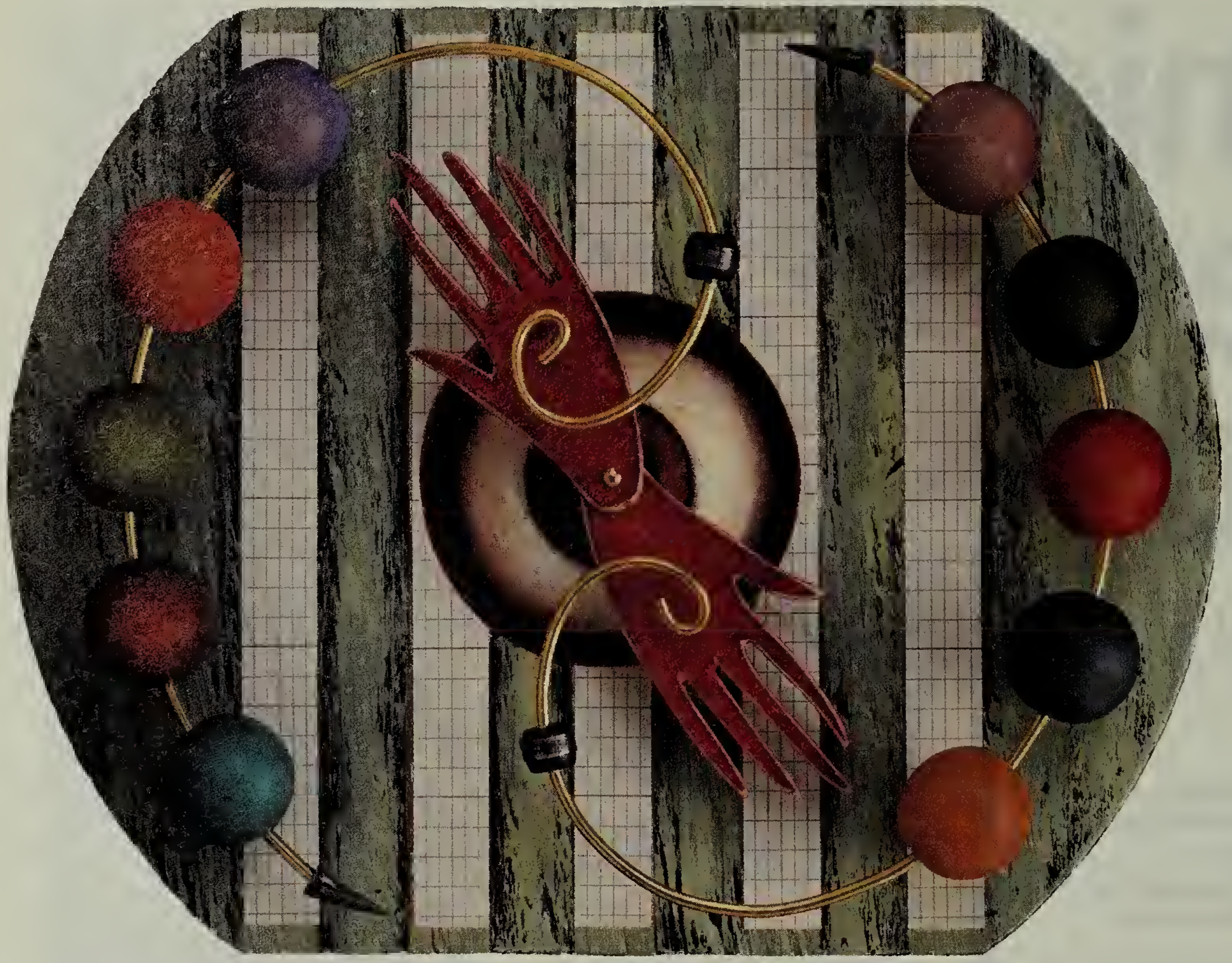
Boise's cost of capital is about 16%. Therefore, the capital charge for investing in the new storage is 16% x $1 million, or $160,000, which EVA says must be added to the $100,000 maintenance costs to get the true cost.

The result: The total cost of the new storage is $260,000, vs. $350,000 for the old storage. "In this case, have you lowered the operating cost enough to make up for spending the capital?" asks Egan. Yes — $90,000 worth.

Boise is constantly reminded of the obvious point that technology isn't free. The company is also aware of the less obvious fact: neither is the capital to finance it. ◗

Berry is an IT management consultant and analyst in Bend, Ore. Contact him at vision@according2jb.com.

MORE VALUE ADDED



MARIA RENDON

The Consultants' Offerings

Consulting firms are inventing their own ROI metrics at a steady pace. Here's a quick look at five more IT evaluation models.

By Steve Ulfelder

WITH IT BUDGETS TIGHT, CIOs are being asked to tally up ROI figures for every sizable project these days. Not surprisingly, consulting firms ranging from Gartner Inc. to two-man start-ups — often founded by Gartner alumni — have stepped in with a full complement of ROI metrics, methodologies, guidelines and benchmarking services to cash in on the opportunity. We've sifted through some of the offerings.

Business Value Index

The Hackett Group, an Answerthink Inc. company, Atlanta ➔ **www.thehackettgroup.com**

The Hackett Group recently revamped and renamed its IT benchmarking methodology. An intriguing characteristic of its Business Value Index is that it offers clients the ability to compare themselves against other enterprises. Hackett has benchmarked 2,000 IT organizations, including those at General Electric Co. and Citigroup Inc., on their alignment with corporate strategy, ability to partner with suppliers, and level of technology integration, according to Bruce Barlag, the firm's president and a former Gartner ROI analyst. Barlag adds that client companies are able to examine the practices that help top-quartile corporations succeed.

From Hackett's extensive database, you can learn, for example, that the average IT organization has 11.5 full-time IT employees per 1,000 company employees, while at high-performing companies, the number is less than half that — 5.2 IT workers per 1,000 company employees.

The other major Business Value Index differentiator is its continuous focus; many customers, including The New York Times Co. and Alcoa Inc., use their initial results as baselines for ongoing measurement. "Most companies benchmark every two or three years, but clients tell us they want more of an ongoing process," Barlag says.

Hackett says a Business Value Index analysis can take as little as two weeks. The firm's Web-enabled software gathers, scrubs and validates data; consultants collaborate with clients throughout the process and then deliver a final report.

Strength: Hackett's large existing database can be used to compare IT practices and business value on a continuous basis.

Weaknesses: May not offer the hard numbers you're looking for; moreover, the index is new and untested.

Information Economics

The Beta Group,
St. Louis **www.the-beta-group.com**

Tom Bugnitz, president of The Beta Group, stresses that although his Information Economics methodology encompasses metrics, they are simply a means to an end — that end being "a holistic view of all IT investments and an understanding of the linkage between IT spending and business results that lets management make decisions."

ROI GUIDE

The Beta Group is another consultancy that includes Gartner alumni among its principals. The key differentiator of the firm's approach to IT ROI assessments is its focus on communication rather than data analysis.

The firm's methodology includes four steps. First, client companies list and prioritize their strategic business endeavors. As part of this process, The Beta Group forces clients to use standard language across all departments and projects.

Second, the IT organization is asked to catalog its technology investments. Again, standard language and metrics are used. With this information, The Beta Group builds what it calls a "project book." At this stage, says Bob Rouse, a company principal, it often becomes apparent that business managers know shockingly little about where the IT group is spending its money.

Next, a scorecard committee, composed of business, financial and IT executives, develops a relative valuation for each IT project. According to Bugnitz, this development process is the core of Information Economics, because it forces executives at the client's company to understand and analyze their IT program in detail.

"People on this committee must learn whatever they need to know about every project," Bugnitz says. "We provide a framework for disciplined thinking about business communication."

Finally, the company creates a scorecard, which is a list of proposed IT expenditures ranked according to their business value. Once a Beta Group client that was faced with a $50 million IT project backlog ran out of money halfway down its list — and simply eliminated the rest, with no ill effects. "The CEO said, 'If the process works, it works,'" says Bugnitz. A typical Beta Group engagement lasts six to 12 weeks.

Strength: Clearly ties IT projects to overall strategy, offering a good big-picture perspective.

Weaknesses: Requires a major effort from the scorecard committee, and the results of the exercise are only as strong as that group's commitment.

IT Performance Management Scorecard

IT Performance Management Group,
Bethel, Conn.
www.itpmg.com

Mike Bitterman, a principal at IT Performance Management Group (ITPMG), is yet another Gartner refugee — he worked in benchmarking at Gartner's measurement division. There, he says, "CIOs would tell us, 'Something's broken, and we don't know how to fix it.' And benchmarks don't tell you how to fix anything." So Bitterman moved on to co-found ITPMG and developed the IT Performance Management Scorecard.

In an ITPMG engagement, the client company establishes critical success factors associated with the health of its IT organization. These factors vary depending on how IT is regarded — as a utility, as a "demand" organization that delivers applications when requested, or as an "enabling" group that truly helps plan corporate strategy. (Brutal honesty is needed here: "Everybody wants to be an 'enabling' IT group, but very few are," Bitterman says.)

With critical success factors and metrics determined, ITPMG's scorecard software, which the firm installs on clients' servers, helps companies develop eight to 15 key performance indicators. The goals: unambiguous metrics, a translation of typical IT jargon into business-value terms. ("Somebody still measures CPU cycles and all that," Bitterman says. "But our software automates your ability to turn that into useful information.")

Developing a scorecard for one department of a company takes six to eight weeks.

Strength: Provides the hard ROI numbers that business executives want to see.

Weaknesses: When it comes to translating age-old IT measurements into information that's useful for business people, "there's still a lot of missionary work to be done," Bitterman says. To fully exploit the IT scorecard, a business must be ready and willing to confront the historical divide between IT and other organizations.

Total Economic Impact

Giga Information Group Inc., Cambridge, Mass.
www.gigaweb.com

Giga Information Group Inc.'s methodology essentially expands on traditional cost analysis by adding benefits and flexibility to the mix. Chip Gliedman, a Giga research fellow, says it's important to factor in flexibility because investments in infrastructure, excess storage capacity or network bandwidth look like red ink in a cost analysis — but offer flexibility that can pay off in time.

Where benefits of an IT project are concerned, Giga, like nearly all its competitors, forces clients past generalities such as "boosts productivity." Gliedman says IT executives tend to slip into a discussion of features but that Giga's methodology keeps them on track. "We don't talk features, but rather business benefits, and we always add 'as measured by' and a metric," he says.

Typically, a Total Economic Impact assessment begins with identification of an IT project's goals. IT then determines technology costs. Next, affected business units decide what benefits they stand to gain.

> **Most companies benchmark every two or three years, but clients tell us they want more of an ongoing process.**
>
> **BRUCE BARLAG**, PRESIDENT, THE HACKETT GROUP

Then flexibility and risk are factored in. "An IBM server will cost more than one from Joe's House of Servers" but is a safer purchase, Gliedman says, adding, "Risk-adjustment lets you decide how much of a discount you require from Joe."

Finally, the results of the assessment are communicated to all concerned parties, and metrics for measuring the project's success are determined.

Giga offers Total Economic Impact assessments as a consulting service or will train businesses to perform their own assessments. A full engagement takes four weeks or more, depending on scope.

Strength: Takes flexibility and risk — major factors in real-world decision-making — into consideration.

Weakness: In some companies, those additional considerations may dilute the ROI message.

Total Value of Opportunity

CHAMPION

Gartner Inc.,
Stamford, Conn.
www.gartner.com

Total Value of Opportunity (TVO) is a methodology based on the Gartner Business Performance Framework, the company's set of business metrics. Gartner analyst Audrey Apfel claims that's an important differentiator: "Generic ROI cases tend to go right from geekspeak to financial numbers, and that's too big a leap," she says.

TVO is available as a Web-based software package, with full training-and-consulting contracts optional. To get started, a business uses Gartner's business metrics to determine what opportunities are available and translates them into standard business terms such as on-time delivery, bill rate, market share and sales close index. One of TVO's strengths is that this translation — which is where many efforts founder — is laid out in excruciating, step-by-step detail, eliminating ambiguity.

Another TVO differentiator is the software's diagnostic capability, which weighs such qualitative factors as the company's IT project history. "Lots of clients tell us, 'We have a great ROI process, we run decisions past our accountants — and then we go on our gut feeling,'" says Apfel. "We tried to make that gut feeling visible."

Strength: Specific instructions can't be fudged, so results should be accurate.

Weakness: May add a level of complexity that meat-and-potatoes executives won't welcome.

Ulfelder is a freelance writer in Southboro, Mass. Contact him at sulfelder@charter.net.

REAL OPTIONS

This IT ROI model, championed by Collaborative Consulting, emphasizes an incremental approach to IT investment:

QuickLink 35929
www.computerworld.com

Where ROI Models Fail

The models don't measure IT's soft benefits, such as customer service. By Thomas Hoffman

NOW THAT COST IS KING, more IT executives are relying on standard accounting methodologies such as net present value (NPV) and internal rate of return (IRR) to cost-justify IT investments to top brass. Sometimes they're using the models because the rest of the company is doing it.

IT leaders "should adopt what the business adopts, and that's fine if that's how the organization wants to view the numbers," says Audrey Apfel, an analyst at Gartner Inc. in Stamford, Conn.

Problem is, say Apfel and other pundits, return-on-investment models are usually incomplete and don't reveal as much as they should about intangibles such as an investment's impact on employee productivity, sales or customer satisfaction.

"ROI models fail because they become overly complex," adds Stephen Andriole, an MIS professor at Villanova University in Villanova, Pa., and a senior consultant for the Cutter Consortium in Arlington, Mass.

Andriole, who has held senior IT positions at Cigna Corp. and Safeguard Scientifics Inc., says that there are roughly 15 financial calculations that CIOs can use to tally ROI, "and that's part of the problem — the more complicated the method, the more you have to feed the method rather than working the project."

That's why Andriole leans toward the use of more simplified ROI techniques, such as payback.

"At Cigna, we had all these complicated ways of collecting the data, with five people collecting data. And I said, 'Whoa, wouldn't it be more effective to have three of those people actually working on the project and just two people collecting the data?' "

Capturing Soft Gains

ROI models also aren't well suited to capturing soft benefits, such as customer satisfaction or employee productivity gains.

"If you reach a customer on the second ring instead of the third ring, how do you capture that? Are they more profitable? Are they happier? The human factor of computer-assisted work is neglected by the ROI model," asserts John Jordan, a principal at Cap Gemini Ernst & Young in Cambridge, Mass.

ROI GUIDE

Further, ROI calculations typically fail to include the complexity costs associated with adding a new application — such as additional hardware, storage or WAN/LAN equipment, and support personnel — to an IT infrastructure, says Jordan. That's one reason he advocates asking another question: What's the cost of doing nothing vs. the cost of making an IT investment?

Jordan paints the following scenario: An IT manager is faced with buying five Unix servers in order to add new services to his company's Web site. The consideration isn't "just the hardware that you buy but the business capability you achieve in three weeks instead of three months," he explains. "That kind of thinking is hard to put a dollar value on."

The problem with relying solely upon financial techniques such as NPV or IRR "is that they don't necessarily capture all of the business benefits of an IT investment, nor do they help to evaluate all of the options that are open to you," says Chip Gliedman, an analyst at Giga Information Group Inc. Giga recommends that CIOs use options models, decision trees and other tools "to try to quantify and communicate the value of those options and the value of that flexibility."

> "We have some areas where we use metrics to measure [business returns]. But in some instances, we have to go on faith.
>
> **TONY SCOTT**, CTO,
> GENERAL MOTORS CORP.

Take a company that's about to install a new application that requires a two-processor server. You have two options, says Gliedman: "You can buy a two-processor server or a 16-processor cabinet and put two processors in it. The first option has higher immediate returns, but the second gives you the option to put additional processors in as they're needed."

A *Computerworld.com* survey indicates that it's common to try to calculate ROI for IT projects. Most of the 113 IT managers responding to last month's survey said their IT organizations do some sort of ROI calculation for major projects; only 6% said they do no ROI calculations at all.

But about half (48%) of the respondents agreed with the statement that "sometimes ROI calculations are a good idea, and sometimes they're not" (see chart, page 40). Many IT organizations go to the trouble of doing the ROI math only for really expensive projects.

Sometimes, financial justifications have to be tossed aside when an IT investment simply makes good business sense, some IT executives say.

As General Motors Corp. Chief Technology Officer Tony Scott put it: "We have some areas where we use metrics to measure [business returns]. But in some instances, we have to go on faith." ▸

Three Problems

Gregor Bailar, CIO at Falls Church, Va.-based Capital One Financial Corp., says the following questions highlight three big problems with using a single financial calculation, such as NPV, to justify and track the benefits of an IT investment:

1. **How does the company arrive at the figures?** For example, does a company factor in depreciation costs for software?
2. **Can you tie a productivity improvement directly back to an IT investment?** For instance, if there's a 10% boost in sales from a direct-marketing campaign, to what extent was that caused by IT?
3. **Who's accountable?** In some ways, it doesn't matter what calculation you use. What matters is who's accountable for the investment and who's responsible for tracking it, Bailar says.

CONTRARIAN VIEWS

John Jordan of Cap Gemini Ernst & Young has written a paper on why ROI models often fail. For a link to that paper, visit our Web site:

QuickLink 36052
www.computerworld.com

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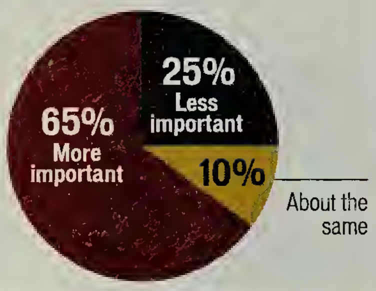
SNAPSHOTS

Growing Importance

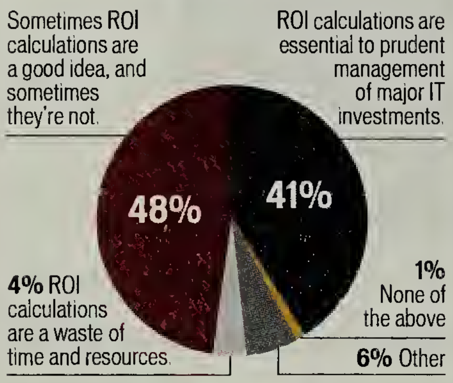
Are ROI calculations for IT investments becoming more important or less important in your organization?



BASE: 113 IT managers involved in IT spending decisions, surveyed at *Computerworld.com*

Prudent or Wasteful?

Which statement matches your view on ROI?



BASE: 113 IT managers involved in IT spending decisions, surveyed at *Computerworld.com*

Top Five Challenges

What will be your biggest challenges in 2003?

1. Maintaining operations with a lower budget
2. Cutting costs
3. Completing major projects
4. Maintaining infrastructure
5. Improving security

BASE: 100 CIOs (75 in the U.S., 25 in Europe)

SOURCE: MERRILL LYNCH & CO., NEW YORK, DECEMBER 2002

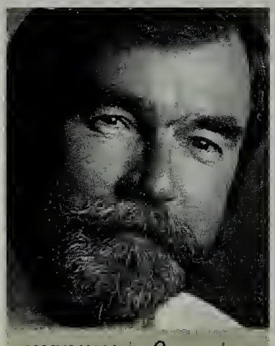
MARK HALL

Forget ROI

A CARTOON IN A RECENT ISSUE of *The New Yorker* depicts the classic scene of a father sitting in a chair, looking over the report card his young son has handed him. The father says, "They may be your grades, but they're the return on my investment." CIOs are hearing similar sentiments when they face their CEOs, perusing a list of corporate IT projects.

It's a lot less funny but at least as silly.

Because just as no child's education can be seen strictly through the narrow prism of "investment," IT operations can't be judged solely on hard numbers. Anyone who tells you otherwise isn't seeing the big picture.



MARK HALL is *Computerworld's* opinions editor. Contact him at **mark_hall@computerworld.com**.

If you're jumping through ROI hoops for every IT project on your whiteboard these days, you're wasting your time. It may sound ironic, but the simple truth is that there's no ROI in analyzing the ROI on everything. At the risk of being labeled a blasphemer, I suggest you rid yourself of the fancy-schmancy, spreadsheet-happy blather of ROI gurus and use your own wisdom to evaluate IT projects.

If it makes sense to you, do it. If not, don't. You know the business. You know the technology. You know your crew. You know your budget. You know if it's feasible or not. What else do you need? A report card for Dad? I think not.

I'm not saying that just because you've got a lofty C-level title and a few years in the industry, you can fly by the seat of your pants. But who knows better which projects have been well conceived, which are half-baked and which deserve never to see the light of day? If you can't make that call, you should look for another job.

After all, your company depends on progress to succeed, and you're in charge of systems that support that progress. Your company's success is utterly dependent on smart people like you who take risks. In a best-case scenario, an ROI analysis is a stall tactic for undeserving projects. Worst case, it's a rationalization for undeserving projects. In effect, ROI analyses justify rejections to division managers or failures to stockholders and venture capitalists.

ROI activity is risk-averse. That makes it ideal in an era when CEOs are listening to their lawyers and accountants more often than they're listening to their CIOs, CTOs and VPs of engineering. If you're a fan of the *Lord of the Rings* saga, you'll know what I mean when I say that Wormtongue — the master of calculating the virtue of caution to the point that opportunities are lost — is the master of ROI. Meanwhile, Gandalf, the advocate of risk and a wizard who rules over what passes for progress in Middle Earth, intuitively understands a situation and knows when to act.

The best, most innovative IT improvements have no ROI. There was no decent ROI on installing the first Wang word processor in the 1970s or the first PC to run VisiCalc in the 1980s or the first Linux server for corporate Web sites in the 1990s.

But the people who took those risks pushed their companies ahead of their competitors and made working there better, improving the lot of their employees and, most likely, attracting more talented individuals who brought even more progressive ideas with them. If we let the ROI Wormtongues rule the day, this decade will never see an analogue to the technological achievements of past decades.

The best CIOs understand the political necessity of living through the latest management craze. ROI is the trendiest of the lot today, so you know it will be tough to stand firm against the rising tide of ROI demands. And I suspect that many of you won't be able to avoid having to submit one mind-numbing report after another.

But when everyone jumps off the ROI bandwagon, your company will still need to depend on your instincts, knowledge and experience. Those attributes got you where you are today, and they, not ROI theory, will be the basis for the best IT decisions you can make. Because wisdom can't be reduced to an ROI calculation. ▶

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The Almanac

An eclectic collection of research and resources. By Mitch Betts

Beware of Fuzzy Math

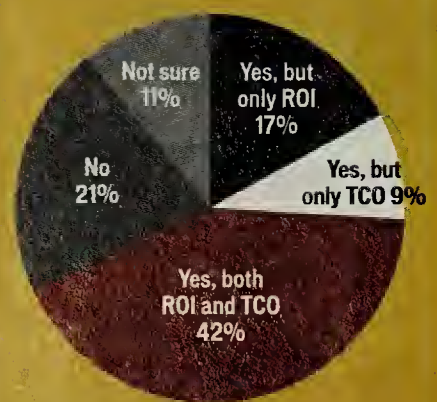
When *Computerworld* conducted an online survey on IT return-on-investment techniques last month, one of the more interesting comments we got was this: "Many times, investments are gambles into where the business is going and ROI [calculations] are fabricated."

Indeed, we continue to get reports of ROI numbers that have been fudged in order to get IT expenditures approved. "It happens all the time," says Amir Hartman, co-founder of Mainstay Partners LLC, a management consultancy in Redwood City, Calif. Office politics, time pressures and less-than-rigorous ROI processes can lead to cooked numbers. "The project sponsor will get a call from his boss saying he needs an ROI number next week. That broken process drives the bad behavior," says Craig LeGrande, Mainstay's other co-founder.

One CIO quipped, "As we say in IT, I don't believe in any numbers I haven't massaged myself."

IT Discipline

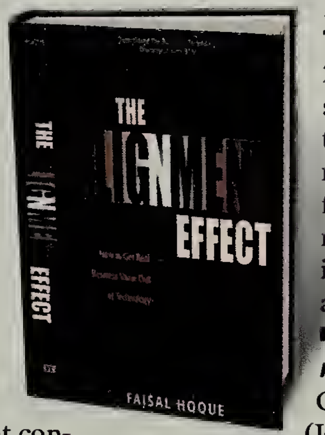
Does your organization calculate the ROI or total cost of ownership for major technology deployments?



BASE: 99 IT managers

SOURCE: CUTTER CONSORTIUM, ARLINGTON, MASS., SEPTEMBER 2002

On the ROI Bookshelf



- ***The Alignment Effect: How to Get Real Business Value Out of Technology***, by Faisal Hoque (Financial Times Prentice Hall, 2002). Advocates a step-by-step "business technology management" methodology for getting the business, processes and IT in alignment — before any money is spent.
- ***The Valuation of Information Technology***, by Christopher Gardner (John Wiley & Sons, 2000). Describes how to perform the financial calculations to make sure that IT produces shareholder value.
- ***Manage I.T.***, by Joe Santana and Jim Donovan (Lahaska Publishing, 2002). Chapter 2 teaches newbie CIOs how to get business and IT in alignment.
- ***Revolutionizing IT: The Art of Using Information Technology Effectively***, by David H. Andrews and Kenneth R. Johnson (Wiley, 2002). Explains how to prevent IT project failures.
- ***Achieving Business Value From Technology***, by Tony Murphy (Wiley, 2002). A Gartner Inc. consultant's executive guide to identifying, tracking and achieving business benefits from IT.

Four New IT Lieutenants

Most IT management staffs "are a kludge of unstructured hirings, promotions and compromises," says Jonathan Poe, an analyst at Meta Group Inc. Therefore, new CIOs who want to succeed past their honeymoon period will need to clean up the mess and install a team of talented IT lieutenants to handle certain tasks, such as personnel matters, so the CIO can focus on IT/business alignment.

Poe says the new IT organizational chart will have four lieutenants:

- **The organizational development leader**, a "change agent" who's in charge of constantly updating the IT department's mission, vision and values.
- **The IT human resources manager**, who handles recruiting, "reskilling," promotions, performance evaluations, compensation analyses and employee satisfaction.
- **The IT financial controller**, who deals with budgets and depreciation, manages portfolios and risk, and measures ROI and total cost of ownership.
- **The IT communications director**, who makes sure the IT shop sends clear and consistent messages, from marketing materials to status reports.

Usability Has Big Payoff

It makes sense that Web sites that are easier to use have a bigger payoff than ones that aren't. Now comes research on the ROI of Web site usability to back up the notion.

A study of 42 e-commerce sites that were redesigned for better usability found that the sites had a 100% increase in the sales conversion rate, a 150% increase in traffic, a 161% increase in user performance and a 202% increase in the use of specific, desired features.

The research was done by usability guru Jakob Nielsen at Nielsen Norman Group in San Francisco. Nielsen says he was pleased to see that the redesign projects allocated an average 10% of their budgets for usability improvements — up from 6% in an earlier study — but he says it should be even higher. ◆

> **"Software costs are the most misunderstood, poorly managed costs within IT organizations. Good software asset management must begin with cost modeling to identify the long-term costs and possible risk exposure associated with licensing software. Contracting for software entails more peril than IT commodity items, yet we continue to see IT organizations – and more often, project teams – fall for vendor hype, with negative results. The importance of cost modeling cannot be understated. In these lean economic times, locked-in software costs cannot be reduced, which prevents effective cost control. Our research continues to indicate that more than 70% of software cost models fail to illustrate the total economics of software acquisition.**
>
> *– William Snyder, analyst, Meta Group Inc., November 2002*

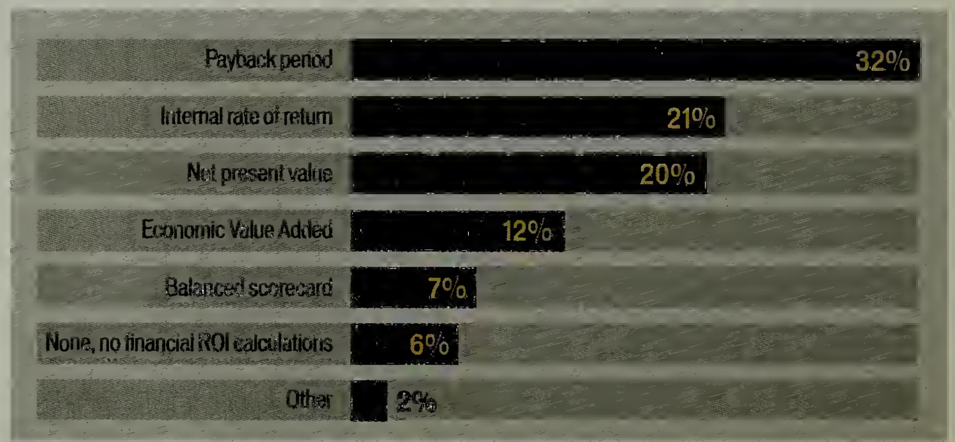
MORE RESOURCES

Our ROI Knowledge Center has research links, tutorials and news. Visit our Web site:

QuickLink k2340
www.computerworld.com

The ROI Metrics Scorecard

Which of the following financial calculations does your organization perform when deciding to make a major IT investment?



BASE: 113 IT managers involved in IT spending decisions; multiple responses allowed

SOURCE: *COMPUTERWORLD.COM*, JANUARY 2003

The Next Chapter

Predictions: Wall Street analysts will start tracking corporate IT investments. And CIOs will find their pay linked to delivering ROI.

WALL STREET CARES

Executives of public corporations will begin disclosing large capital investments as part of their quarterly analyst calls by end of 2003. By the end of 2004, 30% of IT spending will have to pass a board of directors' capital-approval process.

■ *Craig LeGrande, co-founder and managing director, Mainstay Partners LLC, Redwood City, Calif.*

VENDOR CALCULATORS

ROI is here to stay. Chief financial officers are pleased with the structure it brings to IT decision-making, and CIOs can finally sleep well at night knowing they can prove the value of their decisions. But during the next 12 months, we'll see the death of the automated ROI calculators from vendors. They're just sales tools that few people trust.

■ *Ian Campbell, chief research officer, Nucleus Research Inc., Wellesley, Mass.*

COMPENSATION LINKED

CIOs and other IT executives will find their compensation directly linked to their ability to provide ROI to their companies, using a complex formula that monitors effectiveness and efficiency. The formula will take into account the complexity of a company's operations, how quickly the company and its market are changing, and how well the IT organization has been able to address the needs of the business.

■ *Bruce Barlag, president, The Hackett Group, Atlanta*

ROI MYOPIA

Clients say they can't do any projects that don't provide a payback within one year. And look at their IT investment portfolios — they have a lot of small projects that result in incremental improvements. The breakthrough stuff of real competitive advantage is gone. ROI is a great discipline for cutting costs, but we're in danger of developing ROI myopia and missing opportunities to grow revenue and market share.

■ *Eileen Birge, vice president, The Concours Group, Kingwood, Texas*

FINANCIAL PENALTIES

CIOs and vendors will begin to truly collaborate on ROI analysis — and tie compensation to achieving financial returns — by hammering out ROI service-level agreements. If vendors fall short in meeting the SLAs, they'll be asked to make corrections or suffer financial penalties for continued failure. On the flip side, suppliers who substantially exceed the benchmark will be able to extract benefits like additional revenue, testimonials and other marketing support.

■ *Tom Pisello, president and CEO, Alinean LLC, Orlando*

CRM TRENDS

Customer relationship management projects will experience the following trends in the next few years: They'll be smaller, more focused and self-funded from cost savings or new revenue. ROI metrics will be geared to specific vertical industries, such as the automotive, financial services and pharmaceutical industries, instead of being generic. And the goal of many CRM projects will be to identify the most profitable customers vs. the low-value customers.

■ *Adam Klaber, global leader for CRM, IBM Business Consulting Services, New York*

LOW-TECH CIOS

It's ironic that finance departments routinely use sophisticated technological models to manage risk and value investment portfolios, but IT departments have not seriously applied financial modeling techniques to assess the true value of IT projects. That will change in a few years.

■ *Ray Trotta and Chris Gardner, co-founders, iValue LLC, New York*

VIABILITY CHECK

Wall Street analysts, ratings agencies and banks will begin using an evaluation of IT ROI as they determine a company's viability, its future prospects, the credibility of its forecasts and its ability to deliver customer and shareholder value.

■ *David Axson, managing director, The Hackett Group*

CULTURE COUNTS

By the year 2007, 90% of companies will budget for the cost of culture change and factor that into the ROI equation. Companies will no longer turn a blind eye to having billions of dollars' worth of technology sitting unused in closets due to "adoption resistance" by people in the company.

■ *Joe Santana, co-author of* Manage I.T. *(Lahaska Publishing, 2002)*

VISUAL MODELING

Company executives must find a way to shorten the gap between an ROI prognostication and the actual outcome. In three to five years, visual modeling will gain momentum as a way to improve the accuracy of ROI forecasts. Information captured in the upfront design of an IT initiative will provide critical underlying data about tangibles and intangibles, which will make ROI calculations more in sync with what actually pans out.

■ *Faisal Hoque, president and CEO, Enamics Inc., Stamford, Conn.*

PORTFOLIO TRACKING

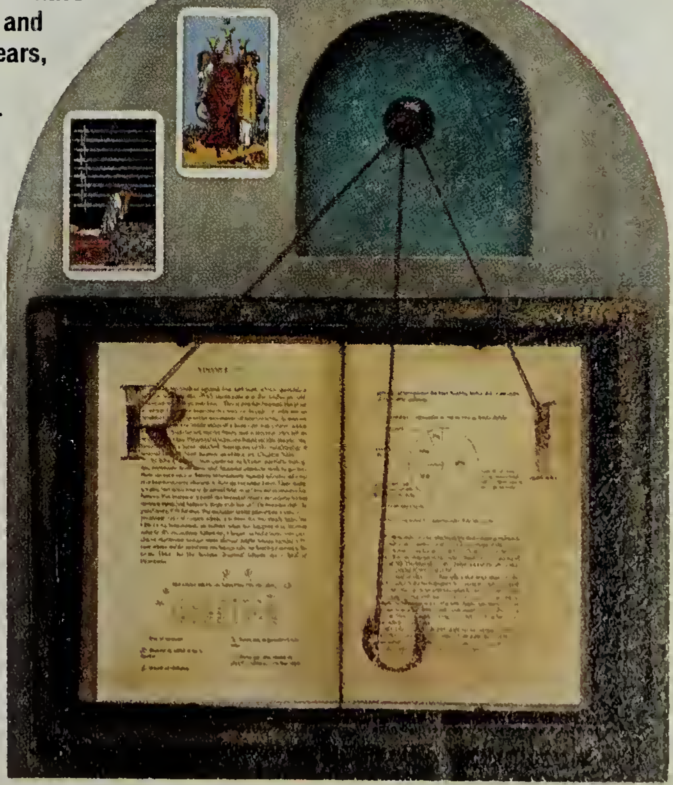
Low returns on large capital investments will stimulate the use of portfolio-tracking software for IT investments. That will boost the market for project and portfolio management software by up to 15% in 2003.

■ *Sanjeev Agrawal, co-founder and managing director, Mainstay Partners*

Finance 101

When it comes to calculating benefits, chief financial officers have been assessing tangible and intangible benefits for years, and it's made an issue only by IT folks and consultants who know little about finance. During the next two years, we'll see finance departments mandating a common structure and consistency when assessing benefits. If you're an IT person today, dig out your old finance textbook and start reading.

– Ian Campbell, chief research officer, Nucleus Research



MARIA RENDON

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SchlumbergerSema seeks a BI/B2B Data Architect for our office in Raleigh, North Carolina to participate in the development and support of various applications within a fast-paced environment. As a member of the Enterprise Intelligence Team, you will be involved with development efforts for internal, B2B and BI applications that are conducted using Microsoft technologies (ASP, VB, C++, BizTalk) and the Cognos Product Suite (Impromptu Web Reports, Powerplay Enterprise Server, Cognos Query). You will also provide support for the following applications: Kronos Timekeeping System, Humanic Human Resources Information System, RDBMS (Oracle 8.17 and SOL Server) and the Cognos Product Suite. Additional duties include support of Movex Business Process Warehouse (BPW), software process design, programming, debugging and testing. Requires: Bachelor's Degree in Computer Science, Computer Engineering, Electronic Engineering, Mathematics or a related field and two years of experience in support and development of the Kronos Timekeeping System, Humanic Human Resources Information System, the Cognos Product Suite and RDBMS Administration (Oracle and SQL Server). Please send resume to: SchlumbergerSema, Attn: Personnel Dept. #SS/002, 30000 Mill Creek Ave., Suite 100, Alpharetta, GA 30022. E.O.E.

Business Systems Leader

Temecula, C.A. Must be a seasoned professional who will manage projects working w/teams that may include members of programming staff & end-users. Interpret bus. end-user needs for all components of HR/Payroll area & translate into business sys. solutions through configuration of SAP R/3 HR/Payroll Module, dev. Prototypes, test plans for modified configuration/software & provide testing w/end-users to ensure solution integrity. Responsible for sys. security & upgrades w/HR/Payroll module. Support all SAP R/3 technical needs associated with HR & Payroll functional area as member of the MIS Dept., eval. HR/payroll business probs., identify/specify application &/or sys. reqs., eval. vendor packages & implement req. software. Provide support/train on software, basic hardware & bus. Solution questions for end-users. Assist development of more complex SAP R/3 repots & data interface w/vendor for HR/Payroll area. Prepare training materials & documentation of sys. changes, configurations, upgrades & enhancements to enable overall training. Bachelor's Degree in MIS (or foreign equiv), 2 yrs IT exp. & 2 yrs exp., which may have been gained concurrently, on SAP R/3 HR/Payroll configuration as Systems Analyst/Programmer Analyst. Resumes to (no calls): M. Hansen, Hudson RCI, 27711 Diaz Rd, PO Box 9020, Temecula, CA 92589-9020.

Computers-Database Administrators needed. Seeking qual. candidates possessing MS or equiv. and/or rel. work exp. Part of the required rel. exp. must include 1 yr. working with database administration & Enterprise Manager. Work with 3 of the following: Enterprise Manager, Oracle, PL/SOL procedures, Delphi, C, Crystal Reports, Quick Reports, Universal Installer, SQL Navigator. OCP certification is a plus. Fwd. resume & ref. to Applied Econometrics, Inc., Attn: HR, 100 University Drive, Amherst, MA 01002.

BI Web Developer

SchlumbergerSema seeks a BI Web Developer for our office in Raleigh, North Carolina to participate in the development and support of B2C and B2B applications within a fast paced environment. As a member of the Enterprise Intelligence Team, your responsibilities will include support and development using Vignette Content Management Server, Tool Command Language (TCL), Flash, Photoshop 6, Crystal Reports and Microsoft technologies (VB, ASP, Commerce Server 2000, SQL Server 2000). Additional duties include support of Movex ERP system and web front end support, PMX Core (e-commerce engine), WebTrends Developers Kit, Cognos Product Suite (Impromptu Web Reports, Powerplay Enterprise Server, Cognos Query), and application debugging and testing. Requires: Bachelor's Degree in Computer Science, Computer Engineering, Mathematics or a related field, and two years of experience in support and development of Vignette Content Management Server, Tool Command Language (TCL), Flash, Crystal Reports and Microsoft technologies. Please send resume to: SchlumbergerSema, Attn: Personnel Dept. #SS/001, 30000 Mill Creek Ave., Suite 100, Alpharetta, GA 30022. E.O.E.

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Product Manager, Commercial

GE Network Solutions, a major designer and developer of geographic information systems software for the telecommunications industry has an opening in its Englewood, Colorado, office for a Commercial Product Manager who will develop new product initiatives and product collateral for GIS software; as well as develop marketing and business strategies and material for technical solutions, sales and service for customers. The product manager will also represent GENS to industry organizations; review proposals for GIS products; and complete risk assessment, orders forecasting and operating margin determination for product contracts. Additional responsibilities include researching industry-wide technical advances and market financial trends; managing relationships with external partners; and preparing proposals for software licenses and contracts.

Qualified applicants will have a minimum of six years experience developing geographic information systems software for the telecommunications industry.

Applicants should send resumes to Kristin Gillen, GE Network Solutions, 5600 Greenwood Plaza Blvd., Suite 300, Englewood, CO 80111. Applications will be accepted via mail only, not by fax or email; please reference job number R2154SC.

Lead Oracle/Internet Developer sought by pharmaceutical R&D Co. in Princeton, NJ. Candidate must have a Master's degree or equiv in Comp Sci & at least 5 yrs of exp in IT, specifically applications development. The following skills are required: 1+ years in pharmaceutical industry; exp w/business development environment and Strategic Intelligence function; min. 3 yrs. exp in web development using Java/JSP/Servlets/Oracle (versions 7-9i, Oracle Application Server 9iAS); Oracle DBA certification; exp w/ Documentum, WDK 4.2.4; Documentum Web Development Kit; exp w/ data modeling using ERWIN & Visio; exp in full life cycle software development of IT projects & applications including design, development, testing and delivery. Ability to lead a small team; manage vendor responsibilities on projects; possess excellent verbal/written communication skills in order to provide technical options to business users. Send resume to: Strategic Staffing, BMS, M/S E14-12, Route 206 & Provinceline Road, Princeton, NJ 08540 Job Code: NS-788.

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InfoGroup NW seeks CSA for HQ office in Eugene, OR. DESC: Anlyz. existing info. sys. & user reqs. Specify, order, install, & customize hardware & s/w for corp. web based customer service & tech. support site util. IRM, Tracker, OpenView. Dsgn, dev, & impl. RDBMS & web apps. util. PHP, MySQL, PostgreSOL, SOL Server, Clearcase, JavaScript, EJB, JDBC/ODBC, JBoss, XML, Perl, ASP, & shell script on Unix & Win o/s. Build & test web & app. servers & install o/s, bundled s/w packages. REO: BS in Engr, CS, or rel. field of study + 1 yr. exp. dsgn, dev, & impl. RDBMS & rel. web apps util. IRM, MySQL, PHP, Clearcase, PostgreSOL, EJB, JBoss, SOL Server on Unix & Win plats. Prem. sal. + benes. Pls. reply to S. Rexius, Job#IG-101, 2225 Coburg RD, Eugene, OR 97401.

CLIENT-SERVER APPS ANALYSTS. provide tech support for claims and/or financial systems and seamless integration with other in-house systems. Implement functions incl. operation setup, conversion, migration, etc. Perform data warehousing & mining. Bachelor's degree in Comp Sci, Comp Eng'g or related, plus 2 yrs exp. as programmer, software eng'r, sys analyst or related is acceptable. Applicant must have knowledge/experience of SQL data base and Crystal reports, MS operating system 2000 & Visual Studio Suite of products. Proof of U.S. Work auth req'd. Resumes to: L. Cannady/Motion Pic. Indus. Pension & Health Plans, 11365 Ventura Blvd, Studio City, CA 91604. No calls please.

Database Administrator wanted by Digital Mktg Agency in CT. Create database design & modeling; maintain production & dvlpmnt database enviro; resolve database problems; assist in dvlpmnt of tech design docs. 2yrs exp in job offered req. Respond to: HR Mngr/EURO, 372 Danbury Rd, Ste 100, CT 06897.

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Positions are available for Software Development Engineer II in Atlanta with a technology solutions company. The company architects and designs next generation software for point-of-sale and Internet systems in the retail industry including entertainment, petroleum with convenience or food stores, and restaurants.

The Software Development Engineer II is primarily responsible for developing financial reporting software for major subsystems or sets of applications. Specific responsibilities include analyzing, programming, debugging, & modifying computer programs for end user applications.

Candidates for these positions should possess a Bachelor's degree in Computer Science or a related field and at least two years' experience in a point-of-sale retail environment including software documentation, utilities and job control languages including SQL, data modeling, OO design, and Visual Basic. Apply with resume by mail to:

Christie LoCurto
Radiant Systems, Inc.
3925 Brookside Parkway
Alpharetta, Georgia 30022

Developer: 2 yrs exp w/ CCOM,DCOM & back end MS SQL Server Relational Database Design & Implementation Enterprise Integration Application Tools & prior exp. w/ financial apps req'd. Submit resume to Dara Ambrose Judge Technical Services 1800 Diagonal Rd. Suite 250, Alexandria, VA 22314

Software Engineer wanted by medical software developer to perform research, design, coding and testing of medical software applications using Java programming language, Enterprise Java Beans, with Oracle and Weblogic application server. Bach. in Computer Engineering required. Send resume to Hamid Amjadi of Prime Clinical Systems at 3675 E. Huntington Dr. Ste. A, Pasadena, CA 91107.

GIS Software Quality Control Specialists (Atlanta, GA & Jacksonville, FL): GIS Software test planning and preparation. Generate test cases and scripts using geographically referenced data, report and coordinate test activities, execute test scripts, record results in a defect tracking pool and implement sound QA testing practices using GNIS, LODE data, GE Small World, Framme, Microstation & Autocad. Communicate and resolve OA issues with Programmers and Developers. Develop & initiate quality standards for new software tools to implement new versions of GIS. 2 years exp. in job offered required. Think Resources, Inc., 280 Technology Parkway, Norcross, GA 30092. No phone calls please. EOE.

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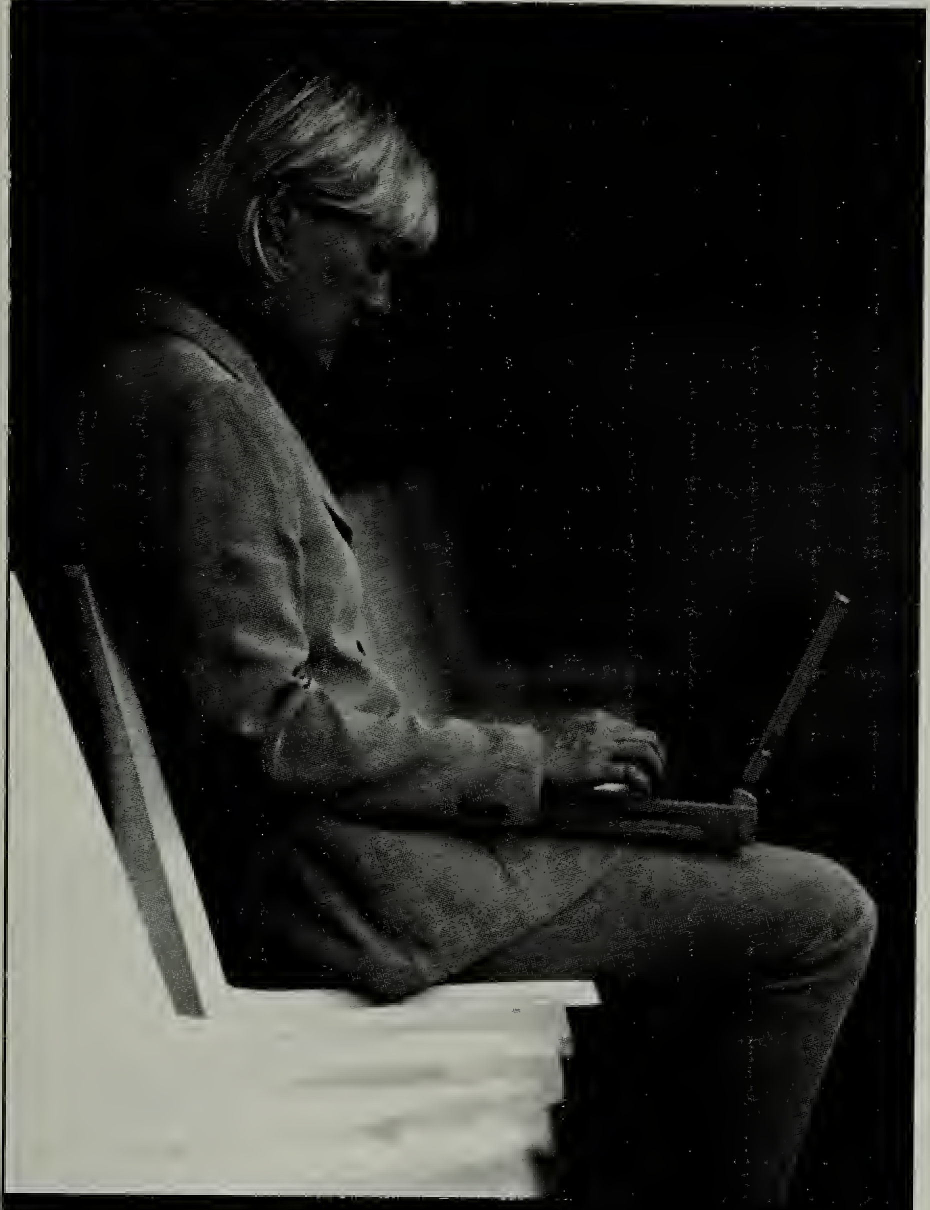

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CAD Potential, Inc. seeks Snr Applic. Engr./Automation Dev. Program automation for Manf Process using C/C++, Unigraphics, UFUNC & GRIP. Dev. E-learning system for CAD/CAM. BS/Engr.+5 yrs relevant exp. or MS/Engr.+3 yrs relevant exp. Also seek Programmer/Applic. Dev. dev+maintain 2-tier&ntier appl for e-commerce+corpo use. Using ASP, VBScript, VB6, J-Script, HTML, SQLL, etc. Mng & doc code changes. BS/Comp SC or Engr+1 yr relevant exp. Both Westminster job loc. Resumes to 1490 W121st Ave., Westminster, CO 80234, Attn HR.

SOFTWARE DEVELOPER, for int'l freight fwdg. Co. in Morristown, NJ. Req'd to conduct analysis, dvlpmt & implmt. of proprietary software for imp/exp sys. in AS/400 & S36 programs. Dvlp & test new & revised sys. Must have Bach. Deg & either 3 yrs exp in job offd or 3 yrs exp as Progr/Anlst. Must be exp'd in Java, COBOL, RPG, CL & OCL. Send resumes to Asst. VP, IT-CC, Panalpina, Inc., 1776 On-the-Green/67 Park Pl., Morristown, NJ 07960.

Financial Engineer-Must have at least MS degree; Employer: Pinnacle West Capital Corporation; Location: Phoenix. Fax resume to C. Enslow at 602-250-3007.

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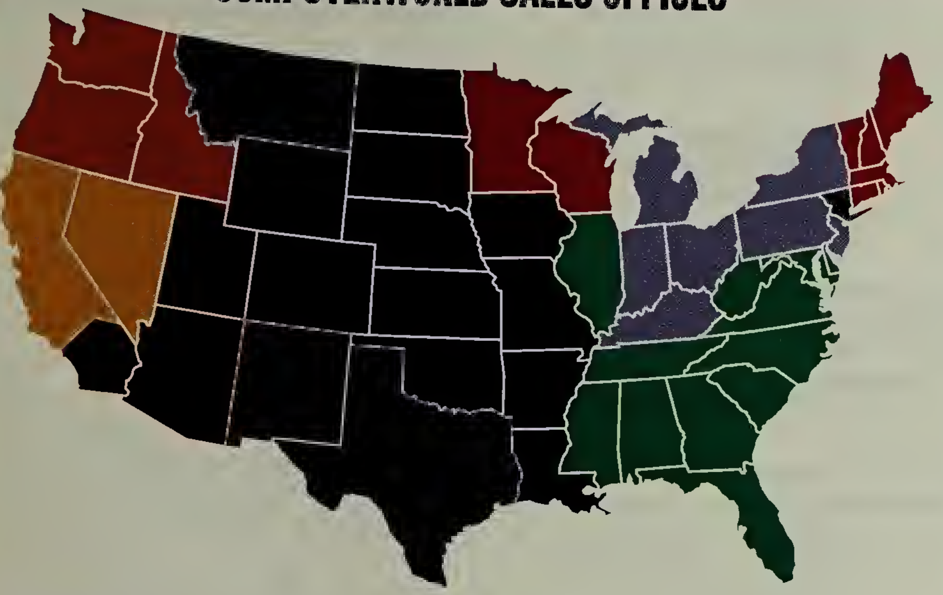

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iSCSI

with iSCSI over the same wire," said Bryce Mackin, chairman of marketing for the IP Storage Forum in the Storage Networking Industry Association, a trade group in Mountain View, Calif.

Joe Bishop, a database systems engineer at NASA's Jet Propulsion Laboratory in Pasadena, Calif., said the lab plans to install an iSCSI network within the next 30 days or so. It will use an iSCSI software kit from Network Appliance Inc. that is being announced today. The iSCSI protocol upgrade for NetApp's 800 and 900 series arrays is free.

The network will be used to back up Sun Solaris servers, which hold flight, financial and project management data in Oracle databases, to network-attached storage devices made by NetApp.

"We want fail-over capability between buildings on our campus," Bishop said. By using iSCSI, the lab can take advantage of its existing IP network and avoid the need to install new cabling, he added.

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Joe Stocker, a network coordinator at Safeco Corp., an insurance and financial services company in Seattle, said he plugged in a 1.5TB iSCSI array in November to offload data from three Compaq ProLiant servers that were using about 90% of their storage space at the time. The array, made by San Diego-based IP SAN appliance start-up StoneFly Networks Inc., cost $25,000 and took just one hour to install, Stocker said.

Although he doesn't think iSCSI technology is robust enough for large server environments, Stocker noted that the technology suited his purposes perfectly. For example, iSCSI required no additional network configuration work or IT training expenditures, as Fibre Channel technology would have, he said.

It will take time for iSCSI to mature into an enterprise-class storage technology, said Tony Prigmore, an analyst at Enterprise Storage Group Inc. in Milford, Mass. But iSCSI will eventually find its way into data centers as an alternative to Fibre Channel technology for some applications, he added. "We expect it to earn its stripes on the periphery and then, over time, migrate to elements of the core infrastructure," he said.

The protocol got off to a rough start last year when IBM stopped development of native iSCSI arrays after its IP Storage 200i appliance met with poor sales [QuickLink 30960]. The company still offers the 200i, but Roland Hagan, vice president of marketing for storage systems, said that in the future, IBM will likely resell iSCSI devices made by other vendors instead of developing its own technology.

Despite IBM's pullback, many small vendors are already shipping iSCSI arrays, switches and host bus adapters. And industry leaders such as Hewlett-Packard Co., Dell Computer Corp. and EMC are expected to roll out devices during the next few months.

Another important milestone will be Microsoft Corp.'s release of iSCSI software drivers for Windows. Microsoft said via e-mail that drivers should be available for Windows 2000, Windows XP and the upcoming Windows Server 2003 within 90 days. ◗

HOW IT WORKS

iSCSI

- The iSCSI protocol uses **IP-based networks** to connect servers to storage devices.
- **It encapsulates data** and SCSI commands in TCP packet headers before sending them over a network.
- Once the packets arrive at a storage server, **the headers are stripped off, and the data is stored.**

SOURCE: MICROSOFT CORP.

Continued from page 1

Datacenter

Under the current Datacenter program, OEMs are responsible for rigorously testing a complete hardware and software configuration — which typically includes a server, operating system, attached storage, storage backup utility and antivirus software — to ensure that it will provide the sort of reliability and performance customers expect from high-end systems. The test configuration must run for 14 days without a failure.

Under the new program, Microsoft has streamlined the process so low-level component changes can be tested more quickly and reliably. Drivers or application components such as antivirus programs and backup utilities can be tested in as little as one day, once they have been certified through VeriTest, the testing arm of Lionbridge Technologies Inc. in Waltham, Mass.

Bob Crownhart, an IT director at Premera Blue Cross in Mountlake Terrace, Wash., said the new, streamlined process could help his company. He recalled a case in which Premera wanted to shift to a new driver level, only to learn that Unisys Corp. hadn't certified it yet. Consequently, Premera had to make sure Unisys and the other vendor hooked up to work out the issue. "It was aggravation and delays," Crownhart said.

But the new certification policy won't help every customer. Koeneke said he was considering five storage vendors, but of those, only EMC Corp.'s had been included in a configuration that Unisys had tested. He recalled that he was once given a price tag of more than $100,000 to test a configuration that differed from the one Unisys had tested, though he was able to negotiate his way out of paying it.

FEATURES RUNDOWN

Microsoft says it has improved the reliability of Windows Server 2003:

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Bob Ellsworth, director of Microsoft's Windows server product management group, acknowledged that substitutions of major components like storage subsystems in a Datacenter configuration will still require the 14-day retest. To address that, Koeneke wants Microsoft to come up with a set of predefined standards for vendors to achieve Datacenter certification.

Ellsworth said Microsoft has heard that suggestion from some customers but isn't yet ready to support that kind of change. "It's something that we're investigating," he said.

Tony Iams, an analyst at D.H. Brown Associates Inc. in Port Chester, N.Y., predicted that the program changes will make it easier to certify products on Datacenter, thereby making more systems available to customers. That, in turn, might spur more Datacenter usage, he said.

Another change that's catching the attention of some customers is the set of new support options that will take effect April 24, with the release of Windows Server 2003. OEMs will no longer be the only choice for support. Instead, users will gain the option to contract for support from resellers, systems integrators or Microsoft.

Customers that have premier support contracts with Microsoft will gain the benefit of having Datacenter as an included product. But they will need a separate registration if they want access to Microsoft's High Availability Resolution Queue, a 24-hour direct hot line to engineers who can solve their problems.

Pricing hasn't been announced for the high-availability resolution program, which is an expansion of the existing Joint Support Queue.

Under the current system, OEMs are supposed to serve as the single point of contact, coordinating support among the various vendors that touch the Datacenter system. It remains to be seen how the new system will play out, since some early adopters don't appear to be following the existing program's procedure for requesting support.

Larry Godec, CIO at First American Title Insurance Co. in Santa Ana, Calif., said he already gets high-availability resolution. When his company has problems, it calls Microsoft, which has "jumped through hoops" to resolve them, he said. Godec said his company's OEM, Unisys, was mentioned as the single point of contact during a couple of conversations, but Microsoft didn't balk in helping out when called first.

Koeneke, too, said he isn't shy about going directly to Unisys, Microsoft or his company's storage vendor, Hewlett-Packard Co., with problems. He said he can't imagine going with a consulting organization for support.

"They aren't in the engineering team at Unisys, Microsoft or HP," he said. "Microsoft is going to get bogged down with certifying a bunch of resellers of support, and I personally have yet to see delivery on repair of the existing OEM support provision." ◗

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FRANK HAYES ▪ FRANKLY SPEAKING

UCITA: Not Dead Yet

IS UCITA DEAD? Nope. True, only two states have adopted the proposed software licensing law called the Uniform Computer Information Transactions Act, and it's opposed by a wide range of legal, consumer and IT organizations. And true, the American Bar Association just washed its hands of this "model" legislation that's notorious for giving software vendors a green light to booby-trap their products (see story, page 6).

But dead? Don't kid yourself.

The National Conference of Commissioners on Uniform State Laws (NCCUSL) has worked on UCITA since the 1980s. It was originally going to be part of the Uniform Commercial Code (UCC), a set of standard laws that make it easier for companies to do business throughout the U.S. Under the UCC, laws governing many commercial activities are the same from state to state.

And uniform state laws relating to software licenses would be good for software vendors and software customers alike — right?

The NCCUSL's lawyers spent a decade getting input and dealing with complaints and negotiating language. They did their best.

But UCITA ended up heavily slanted toward the interests of software vendors. It was so deeply flawed that by 1999, the NCCUSL's partner in drafting UCC laws, the American Law Institute, refused to work on it. Since then, groups ranging from the American Library Association to the FTC, IEEE, the Society for Information Management and a long list of corporate IT users have come out against it. Its main supporters are software vendors.

What's so awful about it? UCITA lets vendors change default license terms at will, without informing customers. And disavow any responsibility for bugs. And sue a customer in any state of their choosing.

Under UCITA, software vendors could booby-trap software so they could remotely disable it if a customer was suspected of violating the software license.

It's a bad law. And today, UCITA looks dead in the water. No state has adopted it since 2000, and three states have passed laws that actually block UCITA provisions from being enforced. It has no real chance of ever offering the benefits of a truly uniform law.

So why doesn't it just die? Why doesn't the NCCUSL junk it and draft new software-licensing legislation that could actually become law in most states?

There's a clue in what NCCUSL President K. King Burnett wrote to the ABA last Monday:

"After meeting with many section officers and other leaders of [the ABA] concerning the Uniform Computer Information Transactions Act, it is apparent that there is a strongly held view among a number of sections and delegates that this body shouldn't take a position on the merits of UCITA. You are our friends, we respect your views.

"We brought UCITA to you and attempted to present its merits in a manner that befits the standards of our organizations. In this respect, we have done our duty — we have no plans to bring this act back to the House. Based on the recommendation of so many of you, we have decided not to ask this House to take a position on this act."

He sounds wounded, doesn't he? His feelings have been hurt. He's done his duty, tried his best. But his baby has been rejected, and he won't expose it to further ridicule.

That's why UCITA won't die. For the NCCUSL, UCITA is a matter of pride, of craftsmanship, of history. The NCCUSL has invested 15 years of work, sweat and negotiation in UCITA, in recent years fighting almost alone in the face of massive opposition. Burnett and his group are too proud to start over again. And since the NCCUSL holds the monopoly on drafting uniform laws, it's UCITA or nothing.

And that means it's nothing — at least until someone persuades the NCCUSL to swallow its organizational pride, start from scratch and get it right.

No, UCITA's not dead. And we'll all have to suffer with that fact until the NCCUSL finally lets it die. ◗

FRANK HAYES, *Computerworld*'s senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

Another Mystery Solved

Salesman complains that his laptop's 10GB hard drive has mysteriously filled up. IT VP pilot fish has it checked out. Yep, it's full – of dirty pictures, including a few of the salesman in the shower. Salesman protests his innocence, but it turns out copies of the pictures are also on the shared network drive. "I asked him how many people in the company had pictures of him in the shower," says fish. "Now we have an opening for a salesman."

SHARK TANK

Care to Try Again?

Boss installs new software to test on his PC, and up pops a warning about conflicts with previously installed software. Continue? Yes, types boss – and when the machine won't reboot, he calls in pilot fish. "It required a full reimage of his machine, and it takes two weeks before all software is installed and everything is back to normal," fish says. Boss's next step? He has his assistant install the same software for testing. "You guessed it," says fish. "Two weeks later, all is back to normal after reimage of employee's desktop."

Where It's Handy

Boss's buddy has a hard disk that has problems booting, so he tells support pilot fish to fix it, then put a disk repair utility on the hard drive. "I try to point out a better way," says fish, "but the boss – who isn't keen on listening to staff when he knows better – barks at me to just do it his way." Two weeks later, the problem is back. And the disk utility? "I wanted to put it on a bootable floppy disk," fish sighs. "Instead, it's right where the boss wanted it: on the hard disk that can't boot."

Top Secret

Company commissions an IT security audit and gets back a list of vulnerabilities from the outside security outfit. "It was a virtual road map for anyone wanting to crack our systems," says pilot fish. "My boss wanted to make it available to upper management – so he posted the entire report on a network drive accessible to all 1,500 employees of the organization."

Which Part of 'No' Isn't Clear?

PC tech pilot fish is asked by his boss to evaluate the IT systems of a company that fish's organization wants to acquire. But, fish protests, it's an old IBM 390 mainframe with terminals, and all I know is PCs. Clueless boss insists, and it's the last straw for fish – after months of dumb ideas, he gives his notice. Boss's response? "He wants to know if I can squeeze in a trip before I leave," says fish, "to look at an old IBM 390 mainframe."

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Getting Strategic With Tape Backup

For users that have outgrown DDS, Sony AIT solutions offer a clear migration path.

If your company has had formal tape backup systems in place for a year or more, there's a good chance no one is giving them a lot of thought, beyond making sure that the regular backups are completed. But there are a variety of new business challenges and advances in data storage technologies that make this the right time to take a fresh look at your tape storage strategy.

Sony's Advanced Intelligent Tape (AIT) is a proven data storage format, now in its third generation, that many organizations are using to meet business challenges in a more consistent and practical way. Unlike legacy tape solutions such as Digital Data Storage (DDS), organizations can use AIT to create a tape storage strategy that adapts to changes in IT requirements while meeting future performance needs.

Organizations often implement tape storage in an ad-hoc fashion, adding tape backup units to PCs and servers as needed, purchasing different units (and even different formats) for individual, workgroup and data center needs. Users of DDS tape systems whose tapes lack the capacity, speed or level of automation to meet burgeoning demands typically need to implement different tape storage systems for different needs, creating the lack of a consistent, broad strategy. That situation relegates tape storage to a tactical (but still important) function, incapable of easily adapting to new business challenges. Those challenges include:

Explosion of data – A few years ago, most users considered only a handful of specialized documents or specific databases to be business-critical data. But that's all changed. E-mail files, Web site content, transaction data, multimedia files, sales materials and PowerPoint slides are among the business-critical data that most organizations want to archive and protect on a regular basis. In 2000, the research firm IDC projected that data storage requirements would grow an average of 87% annually.

Increasing storage costs – With traditional backup systems, more data means more tapes, and more tapes mean more money spent on media. Unfortunately, backup systems created 5 or 10 years ago simply aren't designed to handle the explosive growth of backup requirements we see today. Consequently, companies are caught on a tape treadmill, constantly purchasing additional tapes to handle increased volume.

Greater need for business continuity – While it's always been important to ensure that critical data can be recovered in the event of a problem, over the past few years, it's become critical to ensure that businesses can continue to function in the event of equipment problems or a disaster. For most companies the cost of downtime—even a few hours—can greatly exceed the expense of adequate protection.

New government mandates – A variety of organizations need to archive more data because of new government mandates and industry standards that require increased protection of data, as well as the archiving and storage of a broader range of corporate or customer data. For example, health care organizations must meet requirements for the Health Insurance Portability and Accountability Act (HIPAA), while financial services companies are subject to more stringent Securities and Exchange Commission regulations for data storage.

Faster backup/reduced administration – Backup and restore processes take longer as the volume of business-critical data that needs to be archived grows, both on the desktop and in the data center. The number of tapes necessary to handle that data also increases, as does the administrative overhead. In many organizations, IT personnel spend far too much time managing inefficient tape strategies and not enough time working on tasks that add value to the business.

With such a wide range of new data storage challenges facing companies, it's no wonder that traditional tape storage systems have become almost more of a hindrance than a help. What's needed is a way to turn archival data storage from a time-consuming chore to a strategic advantage—one that can help increase business continuity, increase IT flexibility, decrease the time spent on routine maintenance tasks and proactively meet evolving business needs.

A variety of data storage advances over the past few years bring just such dramatic benefits, especially to organizations currently employing DDS formats. For example, Sony's AIT data storage systems are designed to cover everything from PC backup and workgroup-level requirements to automated data center needs. Instead of having multiple tape formats across these groups, Sony's AIT allows an organization to have a single tape format, providing a seamless migration strategy as backup volumes grow. Enterprises can upgrade to AIT gradually, replacing individual older systems as capacity needs dictate—typically for a price equivalent to that of traditional DDS-4 systems, but with increased performance, capacity and reliability. And with AIT, your investment is protected. Indeed, since AIT was introduced in 1996, Sony has doubled capacity with each generation, culminating in today's super-drive class AIT-3.

AIT also has a number of other important benefits when compared to DDS tape systems, including:

Better reliability – Sony AIT systems are rated for 100% duty cycle (unlike DDS), so they are perfect for automated libraries and network-attached storage needs. In addition, AIT's helical scan recording and Advanced Metal Evaporated (AME) tape provide increased reliability, extended media life and reduced cleaning requirements compared with DDS systems.

Smaller form factor – AME media and helical scan recording provide the highest density of any data tape, enabling high-capacity AIT systems to fit in a 3.5-inch format.

Fewer tapes, more capacity – AIT cartridges can hold up to five times the uncompressed capacity of DDS-4, greatly reducing the number of tapes required for backups and thereby cutting the ever-growing cost of media.

Greater speed – With Sony's Memory In Cassette (MIC) flash memory chip, AIT cartridges provide much faster file access and recovery, reducing the amount of time it takes to recover lost data or downed systems and contributing to a strong business continuity plan.

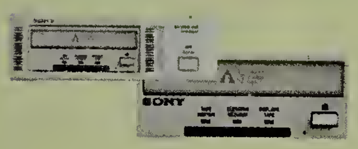
Lower cost – AIT-1 drives cost less than DDS-4 drives, yet deliver increased capacity and speed.

As data volumes grow, perhaps you can make do with your current DDS tape systems by adding more tapes to the backup rotation, allocating more time for maintenance and restoration, and using a jumble of different tape formats for different needs. But in the long run, it makes more sense to reconsider your data storage needs and to find a solution that will provide continuity, consistency and compatibility throughout your entire organization. With proven new technologies such as Sony's AIT tape storage systems addressing today's most pressing business and backup requirements, you can turn your backup processes into a business benefit instead of an IT liability.

AIT Grows With You

AIT easily handles today's, and tomorrow's, storage needs.

Sony AIT Drives and Autoloaders



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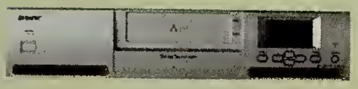

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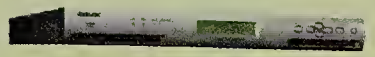
Sony StorStation™ Backup Servers and File Servers



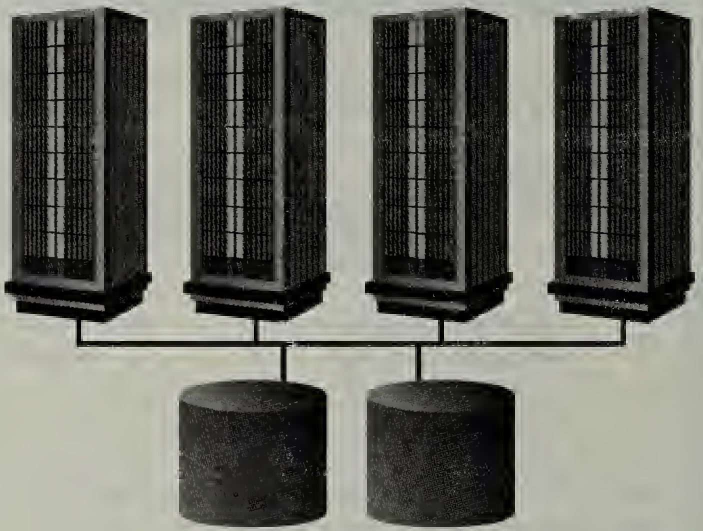
LAN-based backups, remote/distributed backups, data consolidation/sharing

Learn More About

Sony AIT Solutions

Download the free white paper, "Formulating A Tape Backup Strategic Plan," and learn more about Sony storage solutions. Visit www.nwfusion.com/sony/DDSCW

Make Linux Unbreakable



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